INDIA RUBBER WORLD AND ELECTRICAL TRADES REVIEW

Published on the 15th of each Month by

THE INDIA RUBBER PUBLISHING CO.

No. 192 WORLD BUILDING, NEW YORK, U. S. A.

JNO. R. DUNLAP. H. C. PEARSON.

Vol. 5. DECEMBER 15, 1891. No. 3.

SUBSCRIPTIONS: $3.00 per year, $1.75 for six months, postpaid, for the United States and Canada. Foreign countries, same price. Special Rates for Clubs of five, ten or more subscribers.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft, Post Office Orders or Express Money orders on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Post order, payable as above.

DISCONTINUANCES.—Yearly orders for subscriptions and advertising are regarded as permanent, and after the first twelve months they will be discontinued only at the request of the subscriber or advertiser. Bills are rendered promptly at the beginning of each period, and thereby our patrons have due notice of continuance.

Trade supplied by the American News Co. and all its branches.

Entered at New York Post Office as mail matter of the second-class.

TABLE OF CONTENTS.

*Illustrated.

Rubber-Men Should Not Forget Chicago.

THE consensus of opinion from every intelligent source seems to be that the progress made in developing the plans for the World's Columbian Exposition at Chicago is a just cause for surprise. Not only are the spacious buildings, planned by leading American architects, taking form so rapidly as to insure their completion in due time, but the interest in the fair shown in official and commercial circles in most of the civilized countries on the globe is such as to justify the belief that even these buildings will prove inadequate for all the demands for space likely to be made.

The first point to be appreciated is that this is not to be, by any means, merely a Chicago enterprise. It is not to be merely an American affair. Its character as a true world's fair is well assured already. Not even the promoters of the exposition who are located in Chicago and whose interest naturally lies in creating popular enthusiasm in their work are more sanguine in their expressions with regard to it than are the members of the Royal Commission appointed by the British Government to co-operate with the fair management. The secret of this widespread interest is due to the fact that this is to be the greatest opportunity of the age to advertise to the whole world, with a single effort, in one spot, whatever in skill in art and industry demands wide recognition.

At one time the spirit entertained in some leading European countries was that it would be throwing away money to exhibit their manufactures in a country which, like the United States, is striving to manufacture all the goods needed at home, buying from abroad as sparingly as possible of what can be made here. But a new idea has gained ground—the Chicago exposition will afford an opportunity for advertising their wares to all the rest of the world as well the people of the United States, and if the latter do not care to buy somebody else may feel differently disposed. In other words, the United States tariff applies to the United States alone, and will not be a bar to the sale of European products to Mexico, South America, Australia, China and Africa.

The lesson of all this is that American manufacturers cannot afford to be unrepresented at Chicago. Everybody else will have displays there, and it be necessary, both to show Americans what their own factories can do, and to show foreign buyers how our products rank in a world-wide competition, that our home manufacturers should make themselves as prominent as possible. It will be found in many cases that not prices alone, but the quality of goods will determine sales, while many American products are protected by patents against competition from any other country.

There is no other industry in which a more interesting showing is possible than in the manufacture of rubber goods. It is especially appropriate that a full display should be made by the rubber industry, since it has grown up wholly since the discovery of America; its progress has been due largely to American inventive skill, and the

chief source of the material used is the continent discovered by Columbus. It is not too early for our rubbermen to be thinking of the best plans for co-operating in an exhibit which shall indicate to the world our real standing in this industry. The example of the paper-makers may prove of interest in this connection. They have organized the American Paper Exhibit Co., with $100,000 capital, for the purpose of making the best display possible, but not with a view to making any dividend on the investment.

We Keep on Using More Rubber.

ONE of the many indications of the steady growth of the India-rubber industry in this country is to be found in the monthly official statements of rubber imports published by the Government. It cannot reasonably be supposed that our people buy crude rubber, year after year, in increasing quantities, for the purpose of hoarding it, and as the amount of crude gum exported is insignificant, it is evident that our use of this commodity in manufacturing is extending rapidly. This idea is confirmed by the fact that no branch of the rubber-manufacturing business ever seems to be overdone, while new branches of the manufacture are being developed every year. The figures here given represent the value of crude India-rubber and gutta-percha (mainly the former) imported into the United States during the first ten months of this year, compared with the importations for the corresponding ten months of previous years, showing a much higher movement than usual in 1891 :

	Value.
First 10 months, 1886	$12,033,340
First 10 months, 1887	10,930,511
First 10 months, 1888	11,908,058
First 10 months, 1889	9,805,565
First 10 months, 1890	13,873,535
First 10 months, 1891	**15,813,428**

It may be seen, by a little calculation, that the value of rubber imports for this year has exceeded the average for ten months in the preceding five years by $3,603,226.

The statistics of imports in detail for the month of October, the last month for which they are complete, are given below, in comparison with the same month in the preceding year; also a comparison of imports from January to October, inclusive, in each year. The imports of India-rubber and gutta-percha are now recorded separately by the Government at the request of The India Rubber World.

Imports.	India-rubber.	Gutta-percha.	Total.
Quantity, October, 1891	lbs. 4,925,290	10,746	4,936,036
Quantity, October, 1890	lbs. 2,451,067	42,837	2,493,904
Value, October, 1891	$2,075,119	$ 1,698	$2,076,817
Value, October, 1890	$1,221,535	$14,543	$1,236,068
Quantity, 10 months, 1891	lbs. 29,646,109	771,443	30,417,552
Quantity, 10 months, 1890	lbs. 38,303,749	42,837	28,346,586
Value, 10 months, 1891	$15,162,699	$150,729	$15,313,428
Value, 10 months, 1890	$13,858,992	$ 14,543	$13,873,535

Of these heavy importations the value of the amounts sent abroad in a crude state was only $965,203 for the first ten months of 1891, and $142,935 for a corresponding period in 1890.

The value of manufactures of India-rubber and gutta-percha imported was advanced somewhat over last year. The figures for ten months of this year are $335,021, for the same months last year, $292,836.

It is in the tables of exports of domestic manufactures, however, that the most interesting figures in this connection are to be found. Comparisons are made here between October in this year and last, and between periods of ten months in each year:

	In 1890.	In 1891.
Boots and Shoes, October	$ 15,072	$ 29,995
All other, October	99,573	103,377
Total, October	114,645	133,372
Boots and Shoes, 10 months	98,807	135,262
All other, 10 months	899,148	900,042
Total, 10 months	997,955	1,035,304

The value of rubber-goods exports for the ten months completed in this year, compared with the same period in previous years, shows a steady increase as follows :

	Value.
First ten months, 1886	$ 634,750
First ten months, 1887	643,394
First ten months, 1888	702,589
First ten months, 1889	757,416
First ten months, 1890	997,955
First ten months, 1891	**1,035,304**

It is not easy to extract from these figures any other than a favorable showing for the growing industry to which they relate.

Rubber and Brazilian Politics.

THE political excitement in Brazil alluded to in The India Rubber World last month passed, as was then predicted, without affecting the Pará rubber market. Its principal result was the seating of Peixotto in the presidential chair instead of Da Fonseca. Revolutions in South American countries are, after all, only another method of doing what is more quietly accomplished in the United States by means of popular elections. It is possible that another "revolution" may occur in Brazil on any day, but the fact that two or three such events have been experienced there within as many years past without seriously affecting the foreign commerce of that country should prevent any serious apprehension in the rubber trade as to the results of further political upheavals. It may be remembered that even the dethroning of Dom Pedro and the inauguration of the Republic was unattended by bloodshed.

It is not easy to see how any political changes in Brazil —particularly at the national capital—can seriously affect the rubber trade. Nothing short of closing the Amazon River to commerce could long suppress the Pará rubber business, and we showed in a former article how unlikely is the occurrence of such an event. In our own country the most radical change of administration that could happen at Washington would not prevent the manufacture and sale of such rubber goods as are in greatest demand among our people. The relations of politics to commerce are not essentially different in other parts of the world, no matter what the forms of government or of the laws may be.

There is every reason to believe that the rubber traffic of the Amazon valley will increase with every year. As will be seen from statistics appearing elsewhere in this paper, the consumption of rubber is growing rapidly both in this country and in Great Britain, while it may be added that in some of the countries of continental Europe rubber manufacturing is on the increase. The demand for crude gum is, therefore, so imperative that it must be met from some source in increasing proportions. Brazil, having the greatest supply of rubber to be found on the globe, and rubber of the best grades known, and having the rubber-gathering industry better organized than any other country, may be regarded as certain to remain in the lead in supplying this important commodity. Commercial necessities are always superior to mere theoretical politics, and political revolutions are in the end decided by the needs of the commerce of the conntries involved.

Qualifications for a Trade Journal.

A LIVE business man will strive to keep abreast with the progress of the age—if nothing else, self-interest will prompt him to do so, for those that do not are left behind in the race and finally drop out altogether.

To maintain his place in the front rank he must inform himself of what is going on in the world of trade and everything pertaining thereto. Now where is this information to be obtained? A man's field of observation is generally limited, so that he has to look to other sources of knowledge. Advertisements, circulars and price-lists will impart a good deal of information; still as every dealer and manufacturer will show up his goods to their best advantage and say nothing of their defects, this information will not be altogether reliable. Under these circumstances a good trade paper becomes a vital necessity.

A trade paper, to be of real value, should possess the following qualities:

1. Its information must be reliable.

2. It should cover the ground fully, in all its different branches.

3. The discussion of all subjects should be intelligent, unbiassed and fearless, not written for any one section nor for any one class of dealers or manufacturers, but for the information and benefit of all.—*The Iron Age.*

THERE is a consensus of opinion among bicycle men that during next year there will be a boom in their business and consequently a great demand for rubber. As it is now there is no branch of the mechanical-goods line that calls for the use of so much rubber as the bicycle, and next year will be a trying one for manufacturers. The expected proportion of tires is 60 for pneumatics, 30 for cushions and 10 for solid. The new pneumatic of the New York Belting and Packing Co. is described as having an inner tube of India-rubber with a covering detached of cloth inserting in rubber. Generally the inner tube is pasted to the envelope which makes repairs difficult, but in the new invention there is a mechanical fastening, and unlike others, repairs can be made in a few minutes. Mr. Straus is the inventor.

IN answer to a correspondent the *Scientific American* says that a hard-rubber tube will hold mercury for an indefinite period, adding that there is a possibility of its contaminating the mercury, but if its inner surface is polished, it will not do so.

Export Trade in Rubber Goods.

THE export of rubber goods is reported by manufacturers to have been of very satisfactory volume during the past year. Many articles that were formerly imported, some of which were not made here at all, are now exported in large quantities. Some of the rubber-shoe manufacturers now have their own houses in London and Paris, and the trade transacted through them is of growing magnitude. In every important country, with perhaps the single exception of Russia, American rubber boots and shoes are worn. Particularly is this so in Great Britain, France, Germany and Turkey. This change has come around principally from the fact that the American maker has spent a great deal of time and trouble in getting up an article both light and durable, and what is more important, tasteful and neat-looking.

The rubber-shoe was not in vogue in London for a long time, because it was so uncouth and clumsy that English ladies, especially, hesitated to wear it. The "foot-hold" for this reason became a great favorite in London and large quantities are sold there. The English manufacturer is very conservative and is in no hurry to adopt new ideas, but it is expected he will catch on to the rubber-shoe business some time in the future. The Germans have also for the same reason adopted the American shoe and as for the Parisian and the Senorita of Spain and Italy it is a foregone conclusion that it is a dainty shoe or nothing. The Turkish lady is a little particular about her foot-gear and the trade from the city on the Bosphorus is now excellent. This European trade has doubled in 1891.

Australia takes a good amount of boots and shoes, and China and Japan are very good customers, but essentially particular. In South Africa little is done, and the reciprocity arrangement with Brazil has had little effect as yet. Tropical countries favor a mountain shoe. Mexico has done very well in her orders during the year. As to Canada our people have fallen into a peculiar habit of indulging in the thought that that country is a part of the United States and forget to enumerate it when they speak of an export business. A large business is done in that country in shoes of American manufacture, and the picturesque moccasin in Lower Canada is passing away. The lumber districts of Canada call for a large amount of warm goods. Latterly the Canadians have been trying to manufacture these goods at home, but so far the tariff wall is not high enough to keep this and other lines out.

In mechanical goods there is a large export demand principally from European countries. So far it is of the cheaper sort, yet in Germany the merchant advertises proudly the "American goods," which are favorites. Not much suction-hose is used, but in fire and garden varieties, a good trade is had. In belting and packing, as in all mechanical goods an increase in the volume of trade is noted. In druggists' sundries a large export of syringes is noted. The English have a green bulb-syringe not very well finished with which they have tried to hold the market, and which they once sent to us, but that day is past. Goods of this sort sent abroad are generally limited to the speci-

alties. A large quantity of these goods go to Spain. The Chinese and the Japanese take our goods in this line, but they buy the cheapest that can be had.

In clothes-wringers a great business has been done in the past year, a foreign agency of the combined companies having been established in London. In dress-shields a good business is always done, export agents taking large quantities. In webbing we supply a large Canadian trade, some concerns having established branch manufactories over the border.

In clothing we do very little abroad and tropical countries have little use for it. Considerable cloth is imported into this country and it will be a long time before this industry can send its goods abroad in competition with the fabrics of England. It takes a large amount of capital to establish such plants as they have abroad with their wide looms and their well-organized labor.

In hard-rubber goods considerable importations are coming forward, the cost of those goods landed here being sometimes the controlling force. A large company here have an interest in a German company and our exportations are practically in that way. In toys we get balls and figures, the former from Germany and the latter from France. These are, however, on the wane. The rubber substitute is a foreign innovation, a good deal of it coming from the south of France.

The export business is a peculiar one. If the manufacturer has not his own house abroad, a resident agent in New York buys the goods and gives his check for the amount. So jealous is the agent of this trade that he will not give the name of the consignee, having the packages marked with some hierogliphic by which it is distinguished at destination. The export businss is rapidly growing in every direction, one article after another finding its way abroad, and it will not be a long time before the Chinese baby will revel in a teething ring from Yankee-land.

Rubber Exports from the Congo Country.

SOME facts are coming to light relative to the rubber product of the valley of the Congo, of which the explorer Stanley spoke so enthusiastically after his last return from Africa. The Belgian Consul-General in the Canary Islands gives the following statistics of the exports of caoutchouc from the Congo Free State during 1889 and 1890, showing a considerable rate of increase in value, though a falling-off in quantity:

	Pounds.	Value.
In 1889	279,866	$88,566.54
In 1890	272,065	107,403.92

These figures, it must be stated, relate only to the rubber *gathered* within the limits of the Congo Free State. The Congo exports include also rubber gathered in adjacent colonies, the total amounting, in the latter year mentioned, to 1,369,048 pounds, valued at $594,509.10. Holland is credited with taking of this total no less than 536 tons, Portugal 95 tons, Belgium 28 tons and England 23 tons.

The director of the experimental botanical station at Libreville has experimented with the introduction of the Pará rubber tree into the Congo country. He reports that "a single stalk imported in 1887 has furnished 14,000 young plants, which have been distributed to the natives; it is calculated that from this experimental garden, two years hence, 200,000 rubber trees may be distributed."

Weather and the Rubber Trade.

THE weather during the past month has been of a more seasonable character, than during the long drought which was in progress at time of going to press with the last INDIA RUBBER WORLD. Storms have followed one another somewhat rapidly in the northwest, and the West has been quite well covered with snow. In the South there have been good rains. Around New York City the weather has not been satisfactory, rains of short duration having occurred, breaking a drought that came near causing a water famine. This weather, however, has been of little practical good as yet to the retailer. Dealers in wool-lined shoes complain that wet, cold weather has been entirely wanting and absolutely no sales of these goods have been made. Clothing-men are complaining of the city trade.

Growth of the British Rubber Trade.

THE considerable increase recently in India-rubber transactions in Great Britain is aptly indicated by a few figures for which credit is due to the tables published in our London contemporary. It is shown that the imports of crude rubber have been much larger during two years past than the average for the six years preceding; also that while the exports of crude rubber have increased correspondingly, the amounts remaining for "home consumption and stock" for the present year are much larger than for any corresponding number of months in the period under review. In the figures which follow reference is had, in every case, to the first ten months of the year—January to October inclusive—for the reason that the returns for 1891 are of course not yet completed.

The table herewith shows the quantity of imports of crude rubber (in hundred weights), the quantity exported and the quantity remaining for "home consumption and stock" during ten months of each year:

	Imported. Cwts.	Exported. Cwts.	Consumption. Cwts.
In 1884	166,616	90,482	76,434
In 1885	144,146	72,780	71,366
In 1886	147,414	92,535	54,879
In 1887	198,707	97,938	88,274
In 1888	172,962	104,930	68,052
In 1889	195,062	106,774	90,699
In 1890	203,593	120,502	83,091
In 1891	230,731	130,305	100,426

A study of the sources of the imports of rubber shows a steady increase in the quantity of the Brazilian product absorbed, the takings in 1890 showing an advance of 27 per cent. over those for 1886. A still greater increase is shown, however, in African rubbers, 1890 showing an advance of 75 per cent. over the imports for 1886. The Gold Coast and Lagos have recently begun to contribute to the

London and Liverpool markets, and the imports from Madagascar are on the increase. As in the United States, however, the tables of imports never indicate fully the origin of the rubber used. Thus the British imports of crude rubber for 1890 are credited to the following countries, the table showing also the amount from each country :

From—	Cwts.	From—	Cwts.
Aden	202	Germany	7,912
Africa, East	10,158	Holland	3,416
Africa, West	51,751	Gold Coast	18,240
Africa, South	374	Madagascar	5,579
Belgium	526	Portugal	11,619
Brazil	114,510	United States	13,749
British India	16,401	Other Countries	2,094
Colombia	2,257		
Central America	94	Total	264,008
France	5,116		

The value of British manufactures of India-rubber exported has increased steadily, as shown in the following table :

First ten months of 1884	£ 842,617
First ten months of 1885	750,101
First ten months of 1886	793,075
First ten months of 1887	872,405
First ten months of 1888	955,258
First ten months of 1889	933,208
First ten months of 1890	1,012,965
First ten months of 1891	1,030,104

The increase has extended to most countries buying such goods from Great Britain, but especially to France, Germany, Holland, British East Indies and the Australian colonies. The exports to the United States increased from £57,000 in 1886 to £64,000 in 1890. There was a falling-off in the exports to Belgium, Spain, Italy and Canada.

It may be noted that the importation of rubber manufactures for British consumption is also on the increase, the values being reported as follows :

	Total.	From United States.
In 1887	£317,489	£25,479
In 1888	290,573	40,990
In 1889	318,439	50,397
In 1890	360,123	62,056

The principal portion of these imports comes from Germany, with the exception of the items from the United States shown in the table.

Gutta-percha imports into Great Britain for ten months in each year are shown thus, with prices in shillings and pounds :

	Quantity in Cwts.	Average price ℔ cwt.	Total Value.
In 1884	54,995	152 s.	£ 417,648
In 1885	46,479	130 s.	301,707
In 1886	33,460	132 s.	221,088
In 1887	19,898	125 s.	124,426
In 1888	19,810	163 s.	161,378
In 1889	38,942	241 s.	468,960
In 1890	60,494	226 s.	686,013
In 1891	53,414	242 s.	647,927

From 10 to 15 per cent. of the quantities here named were exported in a crude state, to France, Germany, Holland, Italy and the United States, in the order named with respect to amounts.

The Scare Over Foreign Competition.

SOME of the dealers in cloth for rubber clothing think that they have been somewhat deceived by the reports of foreign competition and explain it in this way :

Take four salesmen, one does very well and he is so busy that he is not parading his good work before his competitors and his letters to the home office are full of orders with very little explanation. He has no excuses to make, and if he is vainglorious and disposed to boast, what he says to the outsider is either disbelieved or forgotten and is not passed along from mouth to mouth. Number two does fairly well, and in his talk he feels his way. He does not care to make excuses, nor does he boast. Number three is a little behind, sends in excuses and mildly berates the foreign competition. Number four is a loafer and he also berates the foreign competition in every way known in his vocabulary. One or two members of the class of number four have done a great deal of talking lately, and as business was a little dull, the trade has seen mountains in the foreign mole-hill. One or two of the shrewd heads of houses have quietly investigated below the surface and the foreign competition is found to be trifling in comparison with the full volume of business.

Sale by the Para Rubber Co.

THE Pará Rubber Co. show no sign of intention to start up their works. It was felt by the majority of the stockholders that it would be useless as well as costly to start the factory up unless with the determination of making a long run, and this there did not seem to be disposition to do. The greater part of the manufactured goods have been disposed of, leaving only some 10,000 cases on hand, mostly boots and light goods. The raw stock at the factory consists only of odds and ends. It is probable that nothing will be done with the works till some settlement is reached in the controversy with Houghton, Coolidge & Co. The stock of boots and shoes is advertised by Johnson, Moody & Co., to take place at Nos. 111 and 113 Federal Street, Boston, on December 17.

John Henry Stickney, prominent in the rubber trade, died recently in Boston. Mr. Stickney was the organizer of the Pará Rubber Co. After he had been in the rubber business more than twenty years, Mr. Stickney conceived the idea of this company, and then associated with A. L. Coolidge in organizing the concern. He became treasurer, and after the recent organization was made clerk of the corporation. Mr. Stickney was a native of Maine. He married a daughter of the late Dr. Stedman, and she, with two children, survive him.

The fine buildings occupied by the Pará company were erected in 1881 by the South Framingham Manufacturing Co., at a cost of $100,000, and leased to the Pará concern for ten years, the latter having an option to buy the plant at cost at the expiration of the lease. It will expire about April 1 next.

The South Framingham *Gazette* says : "There is a good

prospect that parties who wish to manufacture rubber footwear will secure control and start the works in due time, and when the proper time arrives it seems very sure that local owners will do everything consistent with good business policy to encourage the resumption of work."

Tariff Rates on Rubber Goods.

THE rates of duties on importations in several of the countries to the south of the United States have been published lately in official form, from which the items relating to manufactures of India-rubber and gutta-percha have been compiled for THE INDIA RUBBER WORLD. As a general thing customs-duties in those countries are levied upon the weight of the goods, regardless of value. The rates of duty have been translated into equivalents in American money, and kilograms into pounds:

MEXICO.

Legal or Net Weight.

	Per Pound.
Elastic goods of cotton and rubber, more than 4 centimeters wide, per pound	$0 .217
Same, not more than 4 centimeters	.363
Elastic goods of linen or hemp and rubber, more than 4 centimeters wide	.22
Same, not more than 4 centimeters	.363
Elastic goods of wool and rubber, more than 4 centimeters wide	.29
Same, not more than 4 centimeters	.55
Elastic, silk and rubber, with cotton, linen or wool, more than 4 centimeters wide	.363
Same, not more than 4 centimeters	1.09
Billiard-balls, of gutta-percha or other material	.725
Tubing, rubber, with or without cloth	.055
Rubber, erasing	.145
Rubber in boots and shoes, with or without cloth	.22
Rubber, spun and in strips, for billiard cushions	.145
Rubber, prepared, dental	.917
Rubber cloth of all kinds, in clothing	.725

Gross Weight (Including Packages.)

Belting, rubber, for machinery, when imported with the machinery to which it belongs	Free.
Same, when not imported with the machinery	.036
Rubber in sheets, with or without cloth foundation	.036

NICARAGUA.

Gross Weight.

India-rubber boots and shoes	.184
India-rubber in cotton stuffs, as shoes, capes, covers, boots, and other similar articles	.184
India-rubber in woolen fabrics, as capes, etc	.257
India-rubber in silk fabrics, as capes, etc	.368
India-rubber buttons	.368
India-rubber toys for children	.221
Artificial teeth and gums and dentists' rubber	.368
India-rubber manufactured in any article not specially mentioned	.294

CUBA.

India-rubber goods, plates, machinery, belts, hose and other similar articles	.088
Shoes, boots, spatter dashes, carpet-bags, life-preservers, and similar articles made of rubber	.151
India-rubber waterproofs, with woolen	.546
India-rubber waterproofs, with silk	1.096
Vulcanized combs, head adornments, tooth, nail and jewelry brushes, penholders and other similar articles of rubber, though combined with any other material	.609
India-rubber, for all other fancy goods of less weight, such as finger and earrings, bracelets, etc., 29 per cent. ad valorem.	
India-rubber catheters, syringes, bands for keeping papers, letter-weights and all similar articles of rubber, though combined with any other material	.974
Textures, the base of which is India-rubber (or cotton elastics).	.336

[These rates have been increased 20 per cent.; there is also a war duty of 25 per cent.]

PORTO RICO.

India-rubber and gutta-percha, in sheets, threads, tubes, hose, shoes, life-preservers, and other similar articles	.084
India-rubber and gutta-percha material in other articles	.252
India-rubber textiles mixed with other materials	.269

[These duties have been increased 20 per cent.]

COSTA RICA.

Gutta-percha in ornamental objects	.363
Boots, rubber	.179
Coats, rubber	.179
Combs, gutta-percha	.179
Gutta-percha in objects not ornamental	.179
Gutta-percha in objects not specified for use in drug-stores	.179
Hose or sprinklers, gutta-percha	.029
Nipples of gutta-percha	.179
Shoes, gutta-percha	.179
Syringes, gutta-percha	.179
Tumblers, gutta-percha	.179

ECUADOR.

Rubber overshoes and other articles of India-rubber	.1669

[With extra duties amounting to 30 per cent. on this rate.]

The tariff rates of Santo Domingo are still more peculiar. The law fixes a valuation for each class of goods imported, levying a uniform duty of 60 per cent. *ad valorem*, with slight additional duties for custom-house and other expenses. The India-rubber items, with the tariff valuations are as follows:

Boots, gum or rubber, per dozen	$120
Shoes, low, gum or rubber per dozen	12
Syringes, patent or elastic each	2

Under the new reciprocity arrangement with Cuba manufactures of India-rubber and gutta-percha from the United States will be admitted after July 1, 1892, at a reduction of duties amounting to 50 per cent.

Potato and Chicle Rubber.

ONE of the mongrel gums which are used to some extent in New York is the Potato rubber, a grade of African, coming from Almadena, and resembling in every way the article from which it takes its name. It is used by insulated-wire men to some extent. When the price of fine Pará soars upwards then the rubber-man is apt to move towards the other extreme, and then the Potato gum gets its chance, at the modest price of 8 cents per pound. Many people incline to the opinion that this price is too much.

Another gum is the Chicle, which is a grade similar to the potato, and used for about the same purposes. It comes from Vera Cruz, the natives using it for chewing-gum. The story of its being used in "tutti-frutti" has been often told. An old rubber-man being told of its use in its native forest tried a little himself and catching the idea set a pace for the jaws of half the maidens in the land and made a fortune for himself.

About 1000 pounds of it is used annually in the rubber business in the United States, and 2000 pounds of the Potato variety.

IN the new play "In Birds of a Feather" Charles Bowser plays the part of a young medical student who has invented a set of rubber lungs to take the place of the diseased respiratory organs of man and beast, and his attempts to introduce his invention are said to be ludicrous in the extreme.

THE RUBBER TRADE OF THE YEAR.

THE chief financial conditions affecting the rubber trade of 1891 in this country were sprung upon the industrial and business world late in 1890. While 1890 was a speculative year and some reaction was due from that cause, the failure of the Barings, upsetting European finance, draining the United States of gold, caused manufacturers in every line of business to move with extreme caution, and all classes to purchase no more than was necessary for current needs. During the year just closing the South has had a reaction from its speculative "boom" in lands, and the Pacific Coast is hardly so prosperous as was expected. The West and Northwest are possessed of abundance and are on substantial and rising ground. All these conditions are, of course, reflected in the rubber trade, as in general commerce.

In the crude-rubber market the event of the year has been the Vianna failure. In January it was evident to the most skeptical that a movement to control prices of Pará rubber was in substantial progress, and during that month gigantic companies were formed in Brazil, avowedly for that purpose. Pará fine was worth about 70 cents then, and in the spring and early summer was marked up to a nominal price of $1.00 per pound, although it is doubtful whether very much rubber was sold above 93 cents, and 91 is fixed as the maximum by some well-informed people. During the summer the Baron de Gondoriz was in New York and afterward visited London, for the purpose, as was learned afterward, of propping up his crumbling "corner," but all his efforts were to no purpose, for in the middle of August the cord snapped and rubber fell rapidly to 58 cents, manufacturers supplying themselves with great freedom as prices fell. Stocks accumulated largely during this period, and the market reacted very slowly to about 68 cents.

Later in the year some apprehension was felt at what might prove to be the secession of Grão Pará and Amazonas from the Brazilian Republic, but although affairs remain abnormal in those states, the anticipation of further revolution has passed away, and the Pará rubber market at the close of the year is in a quiet condition with nothing in the future that can be foreseen to cause any radical change.

During the existence of the "corner" manufacturers of rubber goods seemed to hesitate to urge sales, as if fearing that they could not replace the goods at any reasonable price. As a rule they bought little rubber at extreme prices, having the good fortune to supply themselves in advance; but notwithstanding the hesitancy of operations it is claimed that the consumption of the Pará grades was greater in 1891 than the year previous.

In Centrals a noticeable falling-off is reported in the importations, due to a decline in the gathering in the countries of production. In Africans the increase in the demand has been marked, and it is calculated that 20 per cent. more has been used this year than last. Of some grades, "Flakes" for instance, the demand has fallen off and in Madagascars the aggregate of arrivals has been little if any larger. The market for all grades is about 10 per cent. cheaper than they were at the opening of the year.

In manufactured goods, considering all the influences at work, the results cannot fail to prove that a solid foundation is the underlying feature of the industry in this country. Some serious failures have taken place, but they were the result of methods that could hardly have failed to be unsatisfactory in their termination. The selling of manufactured goods below the cost of making can end only in one way, if continued long.

In the boot and shoe trade the opening of the year showed a very large volume of output in progress. A cutting of prices took place early in the season, followed by a decided difference in opinion between the two leading New England manufacturers. The position of affairs during the summer was anomalous, one manufacturer advancing his prices and the other avowing that he would not. As was natural, jobbers were in no hurry to fill the detail of their contracts, and business was not so brisk as it might have been. In the later months a very large demand sprang up, and mills were worked to their utmost capacity. In some lines the demand remained unfilled. In tennis-shoes there was a phenomenal call. This shoe has grown into popular favor so extensively that its use in this country is almost universal. The closing year, when statistics shall have become fully known, doubtless will disclose a greater output than ever, at fair prices, and, as a rule, manufacturers were well supplied with rubber pending the Vianna incident, obviating the necessity of renewals of stock. The manufacturers have substantially supplied themselves with raw materials on a declining market, and the results can hardly fail to be satisfactory.

In the mechanical-goods line the year has been a fairly good one in its average. In garden-hose there have been spurts, and in the early part of the year a good trade was had in all directions. The weather was fairly favorable, and as manufacturing was also large the sales in this way were above the average. There has been a falling-off in the demand from the South, which has been more than counterbalanced from the West. In fire-hose the demand for replenishment has been fully up to the usual average, but new trade which comes from the organization of new departments in growing villages and small towns has not been equal to that of former years. The growth of population in the smaller villages is not at a rapid pace, and business gets into new channels slowly.

During the year two large new demands for hose have sprung up, which not only have kept certain manufacturers busy for the moment but bid fair to be an important element in the future. For a long time the car-stove has been berated by the public press but owing to an enforced economy on railroads the change to other methods of heating

has been a slow one. A fatal accident on the New York and New Haven road led to an indictment of some of the leading railway magnates of the East, and although they escaped the penalty, the effect was sufficient to cause the rapid adoption of steam-hose in every direction. Also it has long been thought that true economy in the operation of freight trains called for the use of the air-brake, as it keeps the trains in better control and allows of higher speed, which in turn relieves a road more quickly when blockaded. It is believed that there are not enough cars on our trunk lines to transport the grain for Europe during this winter, and a partial relief can be found in higher speed. The air-brake consequently is being rapidly adopted, and the demand is beyond the capacity of those engaged in the business.

In rubber belting a good business has been done. As soon as it was discovered that we were on the eve of a phenomenal wheat crop, it was found that all the elevator capacity would be needed, and manufacturers were taxed to meet the new requirements. In rubber packing it has been a season of low prices, the competition having been more than unusually severe, and the same can be said of some grades of cotton-duck hose. Of course some very poor qualities have been put on the market, but a factor in the situation at one time was the financial weakness of some concerns which had to have money at any sacrifice.

The demand for bicycle-tires has been large and promises to overshadow many other branches of mechanical goods. An idea of the future of this business can be gained from the statement that with nearly 65,000,000 people in the United States there are only twenty-two bicycle factories, while in England, with less than 30,000,000 population, there are 580 such factories. The new tariff is bringing English manufacturers to the United States, and the great disparity in the output of rubber tires in the two countries may soon be averaged up. The United States, theoretically, ought to have 1300 factories. This certainly means a very large coming business to the rubber-men. The business now consumes over 1,000,000 pounds of rubber per annum. In billiard cushions, buckets, mats, stair-treads, and the various other articles made by the mechanical-goods manufacturer, the business has been a satisfactory one.

In clothing the season has been a variable one. Starting off full of promise, manufacturers were confronted with the financial situation which became more pronounced as the season waxed older, and prices were shaded to a point taxing the weaker concerns. The weather was not favorable to trade. An oversight in the framing of the tariff bill caused a close competition from foreign manufacturers which added to the perplexities of the situation. In September a good business started up, but the weather turned unusually mild, the usual equinoctial storm failed to appear, and it looked as though winter itself would entirely neglect the rubber trade. "Old Boreas" has attended to business better in the West, but there is nothing brightening in the situation yet, and the trade are trying to master the situation, each member of it in his own peculiar way, one cutting down expenses, another selling as cheaply as possible, and a third by making the best goods that were ever put on the market.

Factories have been kept fairly busy. The production of cloth naturally outstrips the demand for it in mackintoshes, and workmen in the former capacity are more or less idle. In air-goods, yachting and mountain luxuries there have been a fair increase in the demand, the taste and luxury of the American people calling for special endeavors in that direction. In hard-rubber goods a good steady demand quite up to the average has been had, although the business has not by any means exceeded expectations. In dress-shields it has been as large as ever. In webbing the season has been called a poor one, and the price of rubber thread, which was put up to $1.75 per pound, has been reduced to $1.25.

The subject of insulated wire is an exhaustive one. The output is certainly a large one and rubber is playing an important part, more and more of it being devoted to that purpose. Hardly a large building goes up that has not its equipment of wire, the underground work is increasing rapidly and the number of factories, many of them of mammoth proportions, now devoting themselves to this industry makes it peculiarly a subject of great interest. In the future the new Navy and the Government enterprises will make a grand showing in themselves in this particular line.

The trade in druggists' sundries, with its complexities and varieties, has made an excellent showing for the year. Sections of the country almost unknown to the trade heretofore have developed a good demand, and this branch of the trade is certainly on a rising ground. This feature of the trade appeals to the middle classes and reflects a large share of prosperity among the people at large.

Many of the newly-developed uses for rubber are growing rapidly. In bicycles this has already been intimated; in insulated wire the use, while not new, has developed rapidly; in caps, leggings, over-gaiters and that class of goods the subject is an interesting one; in surgical instruments human ingenuity is always at work and the hospital abounds with devices for the relief of the sufferings of mankind; the baby has its rubber toys, and a pet of the nation her rubber bath. Oyster-shuckers and the finger-pricking professions seek the finger-cot, college teams the perfect foot-ball of rubber, better than any other substance—in fact there is an innumerable list of new things and great productive advances for which 1891 ought to have the credit.

When the balance-sheet of 1891 has been struck it will prove, with all its troubles, some of which after all, to perpetrate a Hibernianism, never came, to have been a good year, full of reasonable, quiet profit, to the majority of workers, and full of promise, for the succeeding twelve months. It looks as though the deferred hope of a "boom" in 1891 will have a partial realization early in 1892.

GUTTA-PERCHA is yielded in Brazil by two species of trees, the jaguá (*Lucuma gigantea*) and the massaranduba (*Mimusops elata*.)

THE SOURCES OF OUR RUBBER SUPPLIES.

By I. A. Sherman.

THERE are merchantable in New York between thirty and forty different sorts and grades of India-rubber, the variations determining the selection by manufacturers in the purchase of stocks. Of course rubber in all its variations is essentially the same, differing somewhat in the same degree as the pumpkin in South Dakota from that in New England—one large and another small, one with little flavor and the other richer in food qualities. The difference between sorts of rubber, however, is due in large measure to the methods employed in gathering the sap. It happens that the natives of the Amazon Valley have always taken pains in the curing of rubber. While climatic conditions in that country may have had their influence upon the character of "Pará," the condition in which this rubber is exported has become a prime factor in making it a favorite with manufacturers. On the other hand, some of the African sorts are so full of bark and stones as to make them almost unfit for use. At one time "Assams" were almost unmarketable in New York, the price sinking as low as ten cents per pound, and not wanted at that. One firm, after long experimenting, discovered a chemical solution in which the rubber was washed, the process being that the bark and other impurities absorbed the chemicals, making them so heavy that they separated from the gum and fell to the bottom and away. This company made a fortune in a moderate space of time, but they put up gradually the price of Assams, from the fact of their creating a demand for that sort of rubber, until the profits became comparatively small, when they disposed of the privilege of washing to some leading rubber-men who use the process at the present day.

Pará rubber is more largely consumed in the United States than any other. It may be noted, also, that the larger share of the rubber exported from Pará comes to this country. There are three grades—fine, medium and coarse. Fine Pará is the standard by which all other grades are measured; it brings the best price, and probably is more used than any other. Should it become irregular in quality in the operation of curing over the smoke of palm nuts—as when little strips of virgin gum occur in the grain—it is called "medium," and its price is lessened by a cent or two per pound.

The "coarse" is imperfect, being composed of the scrapings and refuse of the fine sorts, and sells for about two-thirds of the price of the better grade. It shrinks considerably, having much water in it, and the importer generally is in a hurry to turn it over to the manufacturer. There are again many variations in Pará rubber coming from different localities on the Amazon. This subject is involved in some obscurity, but the best rubber is supposed to be found on the river Purus, a tributary of the Amazon having its source in the Andes. Brazilians, however, are apt to believe that the locality of the best sorts is unknown to Americans, and possibly the Purus may not be the locality.

There comes from Peru, at the sources of the Amazon and its tributaries, a rubber resembling the Nicaragua sheet, and called Caucho. This rubber is very wet and consequently shrinks very much, which is a serious drawback. It is considered a good strong rubber and it is utilized to a considerable extent by the boot and shoe manufacturers.

Of Ceará rubber there are three grades, numbered one, two and three respectively. It is called a "mule gum," the significance being that it is neither one thing nor the other, it being so deficient in elasticity as to cause some to argue that it is not rubber. It is used to some extent in the manufacture of mechanical rubber goods, but as it does not vulcanize like ordinary rubber many firms do not understand the manipulation of it, and it is not very popular. Number one is the finer grade, number two is a mixture of one and two, and number three is very dirty and difficult to use. It consists of reddish-brown string-like pieces made into balls or blocks. It is a very dry rubber, its gathering being peculiar. The tree is incised at the beginning of the dry season, and as the gum oozes from the wound it forms on the outside of the bark, to be pulled off at the end of the season. The gathering of this rubber seems to be on the wane, for every year there is an extensive migration of Ceará people to Pará, bound for the forests of the Amazon.

From Bahia and Pernambuco, in Brazil, comes a rubber of a different grade from that of Pará. It is cured with alum and salt water. The Pernambuco comes in sheets, and is of a yellowish-white tinge. That from Bahia is not so good and comes in round balls. The principal objection to it is that it is very damp, entailing a large loss to the importer from shrinkage.

Of Mangabeira rubber there are three grades, very similar to the Bahia and Pernambuco sorts. It is a difficult sort to work, but it is one of the few rubbers that will cure white, and is largely used for tubing, water-bottles, and articles of that character. A grade that has a red look is considered superior and sells for five or ten cents per pound higher than the others.

From Central America comes a variety of rubbers, distinctive in name theoretically, but owing to the lines of transportation centering at Greytown, and the transshipment at that point to New York, there is much confusion, one sort often getting substituted for another. The Pacific Mail steamers gather also different varieties at Panama with the same confusion. That which comes from Nicaragua is called Nicaragua "sheet" and "scrap." The latter comes in pieces about 2½ feet long, weighing from ten to forty pounds. In the gathering of rubber in the forest, around the cuts in the tree a residuum is left,

which is given to the men as a perquisite, and this forms "scrap." As in the peculiar mode of gathering it is very dry, there is little loss in shrinkage, and this quality makes it a favorite with manufacturers. It contains some bark, but not so much as in the "sheet." The sheet, after it is milled and washed, is the same rubber as the "scrap." Both are cured by the use of a vine from which a soapy substance is formed.

There is another grade which comes from Central America, containing a considerable amount of ashes, due to its being smoked over the latter. It comes in thin sheets ¼ to ⅜ inches thick. It is a dry rubber, there not being so much loss in shrinkage, but it is not so firm as the other grades, and it is difficult to work. There also comes from Central American ports a rubber which is chiefly grown in New Granada, and is called "Carthagena strip." It is from 1½ to 2 inches thick, and there is a great deal of sand and dirt in it. It is a black, tough rubber.

Honduras furnishes a great deal of rubber of the Tuno sort, which is found in many other sections of Central America. Guatemala ranks low in the American varieties, containing a resinous substance which gives it a tarry appearance. It comes in sheets pressed together. There is a rubber which comes from Angostura, as good as Pará. When cut it is found to contain little spots of white as large as a pea. Tuxpan, Mexico, once sent a fine grade of strip rubber, but as the trees have been destroyed by cutting them down instead of tapping for rubber, the imports from there are now very small. The rubber is gathered by scraping from the bark.

Guayaquil comes in large flakes or lumps of a whitish color in the best sorts, the inferior sorts being porous and exuding a black liquid which stains the knife and hands. As in a great many "Centrals," the name is often confounded with the sorts.

Esmeralda comes from Guiana, is a strip rubber, and is also made into "sausages." Some brokers are of the opinion that very little of the real Esmeralda finds its way to America, it being almost indistinguishable from other grades. It brings a high price. Certainly little of it finds its way to Europe, brokers not quoting it there. A great deal of the rubber gathered in Colombia finds its way to the Amazon and Pará.

In rubber from Asia the Assams probably take the lead, and are rated above coarse Pará in price. They come in oblong slabs with a long fibre of two or three feet, about half as wide, and of varying thicknesses. The slabs are wrapped in plaited straw. When cut they have a marbleized appearance somewhat pinkish in color. There are three or four grades, the lower ones being very dirty and all of them requiring much washing. The demand for the higher grades is very large, and it is brought in a great measure under contract. Still considerable quantities find a way to America by way of Hamburg and London. These grades are a strong resistant rubber and find their way chiefly into mechanical goods.

There are two grades of rubber coming from Borneo. The rubber from that source was first called a gutta, on account of its geographical location, but this error was a palpable one and soon corrected. It is a white, soft, porous or spongy rubber, the pores being filled with salt water or whey. This is caused by using salt to coagulate it, the outside of the ball, in which shape it comes, being acted upon first, which makes little cells in the interior, filled with salt and water. As this rubber becomes old it changes in color to a dull pink or red, and the water evaporating leaves a saline incrustation in the cells. The better grade is a fair rubber, but the second grade is often when cut almost as soft as putty and practically worthless. The shrinkage in both grades is very large—from 25 to 50 per cent. It is used mostly for mechanical preparations, and to some extent in the manufacture of hard-rubber goods.

Of Africans there are many varieties. The favorite sorts come from Madagascar. The pinky sort comes in the shape of round balls, weighing 1½ to 4 pounds. It is black on the outside, natural from exposure to the air, but when first cut it has on the inside a pinkish-white look, and is susceptible of a fine polish which makes it a favorite with hard-rubber men. It is not so strong, however, as fine Pará. There is always a good demand for it, and it is rarely found in store, being sold "to arrive." This sort comes from Tamative. There are two or three variations in quality of Madagascars, but the grade called "black" comes from Majunga, is exported in small balls and has a dark color when cut. This latter grade is used to some extent by mechanical-goods men and is worth about ten cents less per pound than the pink, which latter ranks next to Pará.

From the West coast of Africa there are many varieties, the best coming in the shape called "thimbles," which are square pieces, one inch each way. The rubber is very dry, and is in good demand by mechanical-goods manufacturers. It is a very strong rubber, and naturally has little shrinkage. Tongues are shaped as their names indicate. There is considerable shrinkage, but it is a very good rubber. There is also a small ball rubber about 1½ inches in diameter. It cuts white and is fairly firm.

Congo ball is made from small strips of rubber and rolled into balls, from one to 2½ inches in diameter. It is a firm and very elastic rubber but there is more or less bark in it, and as manufacturers do not always have proper machinery to exclude it they do not buy readily.

Sierra Leone comes in balls three to four inches in diameter and is a very fair grade of rubber. It has a considerable demand from boot-and-shoe and mechanical-goods men. Like all West-coast rubbers it reaches us by way of Hamburgh or Liverpool.

The finer grade of Mozambique is called "white ball." It resembles Congo ball in appearance and comes in about the same shape. The "red ball" is mixed with a reddish bark and gets its name for that reason. Oftentimes both varieties of "ball" will be found filled in the center with bark. The rubber is then called "unripe Mozambique" and sells for ten cents less per pound.

"Flake" is used very extensively as a friction rubber in mechanical goods—as in hose, where duck is used. It is

a soft rubber and cannot be used on hot rolls, as it would stick badly and also run in an annoying manner. It is compared to molasses when it starts off on such a trip, consequently it is used only on cold rolls. For hose, and in cases where cloth is used, it is a very useful rubber.

From Liberia comes a lump rubber, which is harder than "flake." There are three rivers in Liberia from which rubber is gathered, but it is all assembled at the common mouth and the grades are not kept separately, making a class of rubber which is very variable, and therefore disliked by manufacturers.

There is on the whole a growing tendency toward the use of Africans, and in this is a true check on the price of Pará. In Centrals there seems to be a falling off in the production consequent upon a scarcity of labor, which has been from time to time drawn into internal enterprises. In Europe the stocks of Africans are always larger than of Pará, and a steady growth is very noticeable.

New Method of Purifying Gutta-Percha.

THE following details are given by our London contemporary in relation to the British patent No. 9231 (1891) granted to Reginald Haddan for Alexandre Grammont, Pont de Chérui, Isére, France, for a method of and apparatus for the purifying of gutta-percha :

Up to the present the purification of gutta-percha has been performed mechanically, all the operations necessary being long and costly, and, in spite of care and time given to the process, it is difficult to obtain an absolute pure product.

The improved method which forms the subject of this invention consists broadly in dissolving the raw gutta-percha in a suitable solvent, and treating it to successive purifications while in solution. This refining process consists of three principal operations, which take place substantially in an automatic manner in the apparatus used for this process, and which also forms part of this invention.

These three operations are—first, the extraction of matters foreign to the ordinary composition of the gutta-percha, such as earthy matter, sand, wood, water ; secondly, the extraction and separation of the oxidized gutta-percha, giving product No. 1 ; and thirdly, the extraction and separation of the resinous matters contained in product No. 1, and also in product No. 2, being the residue that remains after extracting product No. 1.

The method is carried out as follows : The gutta-percha to be treated is triturated to reduce it to small fragments and placed in an iron or wooden receiver, in which are movable pallets or mixing devices. Bisulphide of carbon is then allowed to flow into this receiver from a tank placed on a higher level. The agitator or mixer is then moved to stir together the bisulphide of carbon and the crude gutta-percha until the soluble matter therein is all dissolved. A cock at the base of the receiver is then opened and the solution passes into a filter, which retains the solid matters not dissolved in the bisulphide of carbon, which foreign matters are thus separated from the gutta-percha. The solution passes into a series of depositing vessels ; in these vessels the oxidized gutta-percha separates gradually from the pure gutta-percha by reason of a difference in density. The pure gutta-percha is drawn off into a lower vessel, in which the bisulphide of carbon is evaporated, leaving only pure gutta-percha, containing, however, still some resinous matter.

The vapor of the bisulphide of carbon is carried off and condensed in a worm and returned to its storage tank to be used again for dissolving crude gutta-percha. Two products are thus obtained, one being oxidized gutta-percha containing resin, the other non-oxidized gutta-percha also containing resin.

Before treatment to remove the resin, the oxidized gutta-percha requires to be de-oxidized, which may be done by passing carbonic oxide gas into the vessel containing the solution of oxidized gutta-percha. The carbonic oxide gas removes the oxygen, being converted in carbonic dioxide or carbonic acid gas. The resulting de-oxidized gutta-percha may be mixed with the non-oxidized gutta-percha, or these two products may be treated separately for removal of the resin, according to the quality of the ultimate product required.

To remove the resin, an apparatus is used similar to that employed for the first part of this process, or even the same apparatus may be used, if desired. Instead, however, of using bisulphide of carbon as a solvent, benzine, or essence of thérébentine, or any other essential oil which dissolves resin, is used.

The solution is made in the mixer as before, passes through the filter into the depositing vessels, where the resin separates from the gutta-percha, so that by simply drawing off at proper levels, the two products are separated. The gutta-percha solution is carried to the evaporator, where the solvent is evaporated, to be re-condensed for use again, and the pure gutta-percha is left in the apparatus. The oxidized gutta-percha after de-oxidation is treated in the same manner, and forms a product of secondary quality.

It Decoyed Ducks but not Buyers.

TO THE EDITOR OF THE INDIA RUBBER WORLD :—Why cannot some bright manufacturer make a rubber decoy-duck, that shall be better than the wooden one that sportsmen are now obliged to use ? It seems to me here is a field for some inventor, and something that would meet with a ready sale.

SPORTSMAN.

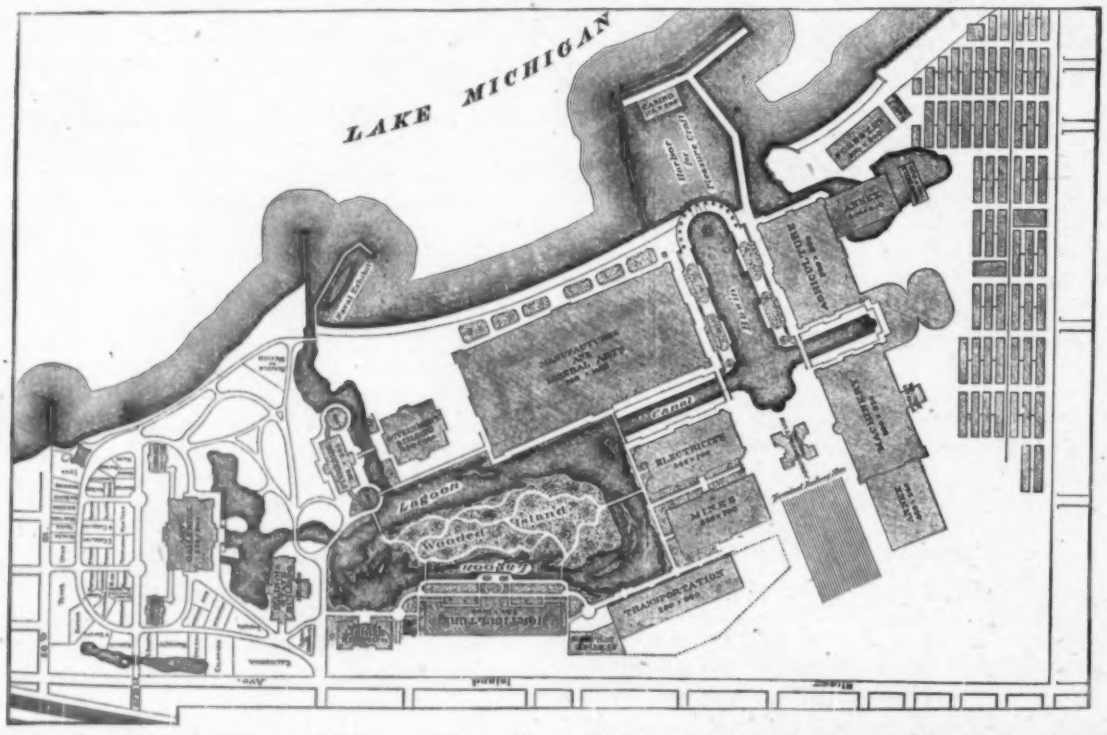
Fall River, Mass., December 2, 1891.

[A number of years ago a duck was made of rubber and whalebone and found to answer the purpose very well indeed. A few years after a patent was granted for a compound for making them, which consisted of a very light combination of granulated cork and rubber. These ducks, however, were costly and did not seem to attract game any better than did the ordinary wooden and metal ones that are sold to-day ; they therefore did not find a large market and it is a question if they ever will.—EDITOR.]

THE WORLD'S COLUMBIAN EXPOSITION BUILDINGS.

By J. Kendall Freitag, Assistant Engineer to the Exposition.

SINCE the designs for the World's Columbian Exposition buildings were approved in February last, a tract of land a mile and a half long and nearly a mile in width has been changed from lowland marshes to a uniformly-graded park, relieved by winding lagoons and gently-sloping terraces already turned to masses of lilies under the touch of the landscape architects. To those who know Chicago's spirit it seems but natural that the marshes which, but a few years ago, served as feeding-ground for the ducks flying along Lake Michigan, should suddenly be the scene of bustle and activity, the home of



thousands of workmen toiling at all nours of day and night, to the sound of creaking dredges, snorting locomotives and buzzing saw-mills. Those fortunate enough to pass the gates find within the park limits a far different scene from that presented back in the early spring months. Where rude tents then partially sheltered the laborers employed on the grading, there are now large and comfortable frame houses for the army which it is expected will be employed this fall. Three hundred carpenters for one structure seems like a breezy tale from Chicago, yet that is the number expected to be at work on the main building.

Indications multiply from day to day that the World's Columbian Exposition will incomparably surpass all previous international exhibitions. That of Paris was confessedly phenomenal in its comprehensiveness, but the scope of the exposition of 1893 is increasing so rapidly and the classification is beginning to comprise exhibits on snch an enormous scale, in departments heretofore either but lightly represented or entirely ignored in great expositions, that the trouble now seems to be to provide adequate room to satisfy exhibitors. It is the aim of the exposition company to keep pace with American enterprise and to surpass all previous attempts in point of comprehensiveness of display, style and magnitude of buildings, beauty of grounds and convenience of the public.

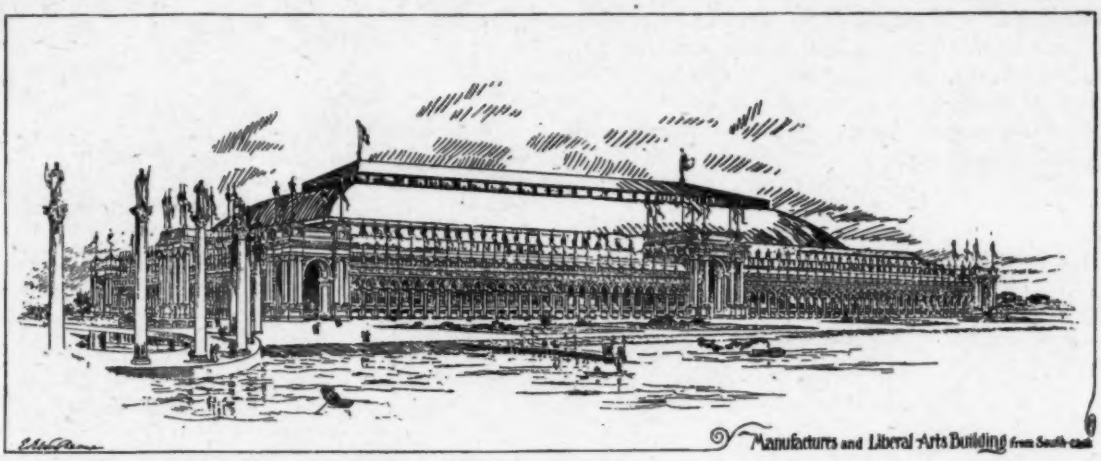
The South Park system comprises two large parks—Washington Park lying inland from the lake and connected to Jackson Park, on the lake shore, by the Midway Plaisance, a strip of land some 600 feet wide and a mile long. The Fair site includes the Plaisance and Jackson Park, but of the latter, previous to the present summer, only the north end or some eighty out of a total of a thousand acres has been improved and in use. This portion of the park is shown on the map between Fifty-sixth and Fifty-ninth streets, and is reserved for the State and foreign exhibits, together with the art galleries. The beach at this portion of the park is shown in an accompanying engraving. The best idea of the magnitude of the site can be obtained, perhaps, from a comparison with the Centennial and Paris expositions. The Centennial covered 230

acres of ground, having 47 acres under roof, the main building requiring 20 acres. Paris devoted 173 acres of ground, the principal buildings covering 55 acres. The Columbian Exposition will embrace a thousand acres of ground, 87.4 of which will be under roof (not including any annexes, State or foreign buildings), itemized as follows:

Manufactures and Liberal Arts	30.5 acres.
Machinery Hall	9.7 acres.
Agriculture	9.2 acres.
Mines and Mining	5.6 acres.
Electricity	5.6 acres.
Horticulture	5.2 acres.
Transportation	5.5 acres.
Fine Arts	3.6 acres.
Government	3.3 acres.
Forestry	2.3 acres.
Fisheries	2.0 acres.
Woman's Building	1.8 acres.
Dairy	1.7 acres.
Administration	1.4 acres.

The architectural grouping of the buildings is arranged with reference to two principal axes, the one running down the center of the main court, from the Administration building through the grand basin of the Casino on the pier, the other transverse to this, extending down the canal between the Manufactures and Electricity buildings, along the island to the Illinois State buildings. The railway terminal will land the visitor in a line with the first mentioned axis, at the court opposite the Administration building, which, with its gilded dome of aluminum as high as the Auditorium tower, or 260 feet, is the focus of the whole architectural scheme. It is in classic style, the first story of the Doric order, the second in Ionic, and is the design of Richard M. Hunt, President of the American Institute of Architects. It will contain the offices of the commission and local exposition company, police and fire departments, dispensary, bank and bureau of information. The cost will be $650,000. In front of this buildin is the grand plaza bordered with balustrades, and sloping by a series of terraces toward the basin. The principal architectural effect of the main buildings will be obtained from this court, and at night innumerable incandescent lamps will follow the outlines of the buildings.

Machinery hall, to the right, designed by Peabody & Stearns, is a bold and impressive structure, rich in architectural line and detail. It is 850 by 500 feet, spanned by three rows of arched steel trusses, surrounded on all sides by a gallery 50 feet wide. The trusses will be built independently, so that later they may be disposed of as salvage. "A grand World's Fair machinery hall—fifteen acres of Ionic architecture—which can be taken down and set up again as three union depots in as many cities. The idea is worthy of Chicago," so a local newspaper has it. In each of the three long naves is an elevated crane, travelling from end to end of the building. After being used for handling the machinery exhibits these cranes will serve during the exposition as travelling platforms, so that the visitor can get a constantly changing point of view. Steam power for this building will be supplied from an adjoining power-house on the south side. It is estimated that 24,000 horse-power is required for the Fair machinery —8000 for the main hall, and 16,000 for the engines operating the electric lighting, power and pumping plants, the latter of which alone will have a capacity of 40,000,000 gallons a day. Electric power will be used in all the buildings except Machinery hall. At Philadelphia one Corliss engine of 1456 horse-power did all the work, and Paris used but 6000 horse-power.



Manufactures and Liberal Arts Building from South-east.

AGRICULTURAL BUILDING.

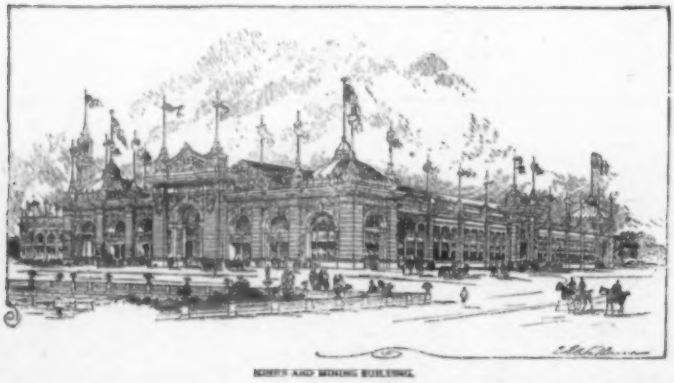
Nearer the shore of Lake Michigan and almost surrounded by the lagoon stands the Agricultural building,

by McKim, Mead & White, in classic style like the rest, and of about the same dimensions as Machinery hall, 800 by 500 feet. The general cornice line is 65 feet about the plaza. Pavilions at the corners and at the center of each of the façades are connected by curtains, forming a continuous arcade around the building. The center pavilion at the main entrance is 144 feet square, enclosing the rotunda 100 feet in diameter, surmounted by a glass dome 130 feet high. Groups of heroic statuary, emblematic of the agricultural industry, are grouped about the entrances and main vestibule. Between, and connecting these two

MACHINERY HALL.

buildings last mentioned, at the extreme southern end of the canal, comes the colonade, which serves as a shield and entrance to the live-stock exhibit, located at the southern limit of the park. This exhibit lying, as it does, at a lower level than the grand plaza and terraces of the main court, and behind the Machinery and Aricultural buildings and Colonnade, is kept entirely distinct from the architectural *ensemble* of the building. Adjoining the colonade is a pavilion or show-ring for live-stock exhibitions. Dairy, forestry and saw-mill exhibits will also be located here.

At the lake corner of the Agricultural building is the entrance to the pier running out 1800 feet into the waters of Lake Michigan. On its water end is to be a Venetian pavilion or Casino, open on all sides, and containing a restaurant and music hall. A substantial breakwater to the north insures a safe harbor. It is expected that small boats of the various nations with rowers in national cos-

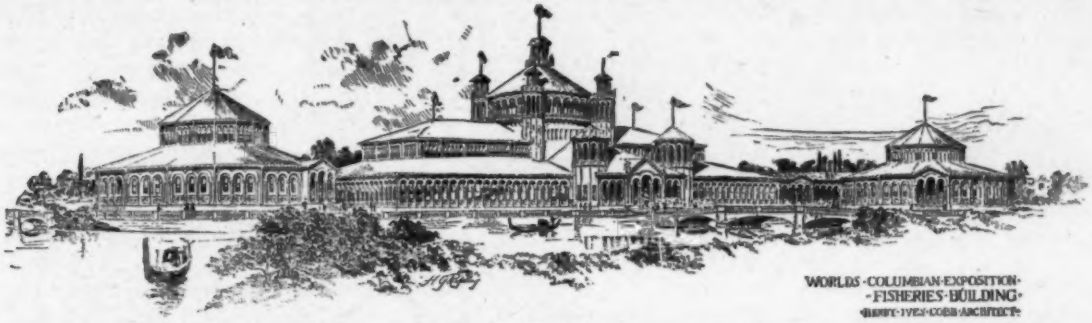


MINES AND MINING BUILDING.

tumes will flit over the water of the harbor and lagoons, adding color and picturesqueness to the scene with their bright tints, and forming a delightful means of transportation through the grounds, leaving the visitor at steps or landings in front of any of the buildings. Looking directly west from the Casino, down the basin on the main axis of the largest buildings, can be obtained one of the finest views of the Exposition grounds. At the lake end of the basin, or at the shore directly opposite the center of the harbor, there arises out of the lagoons a colossal statue of Liberty, surrounded in a semi-circle by columns emblematic of the thirteen original States. These are being designed by Augustus St. Gaudens.

Along the lake shore and north of the harbor stands the largest of the Exposition buildings, that devoted to Manufactures and the Liberal Arts. It is in the French Renaissance, designed by George B. Post, and is a third of a mile in length, or 788 by 1688 feet. The original design contemplated a quadrangle about 200 feet wide, with a huge dome at the center, leaving an open interior court on either side in which were to be placed the leather building and music hall. But the demand for space has been so great that the dome has been discarded, and the whole space inside the quadrangle is to be spanned by a semi-circular three-hinged arch of 380 feet span. This will be the largest roof-truss in the world, being of the enormous height of 210 feet. Across the canal one will come to the Electricity building, by Van Brunt & Howe. This is in the Italian Renaissance, 700 by 345 feet a nave and transept of 115 feet, steel trusses, with side galleries, provide space for what will undoubtedly be one of the greatest features of the exposition. The building will present a sparkling appearance at night with numberless incandes-

cent lights. A statue of Franklin by the distinguished Danish-American sculptor, Carl Rohl-Smith, and medallions of famous electricians will adorn the main entrance or hemicycle. The Mines and Mining building will be of about equal size with the Electricity, or 350 by 700 feet, and is the design of S. S. Beman. Steel cantilever trusses of 115 feet central and 57½ feet side spans form the striking feature of this building. A balcony 25 feet high and 60 feet wide encircles the building, and leading to it are light stairways.



The Transportation building lies next along the lagoon, forming a most striking edifice. It is the work of Messrs. Adler & Sullivan, of Chicago Auditorium fame. It is long and narrow, 960 by 250 feet, with provisions for large annexes of about nine acres, which will contain complete passage and freight trains. The exhibits in this building will include everything devoted to purposes of transportation from a baby-carriage to a Mogul locomotive. The design is Romanesque in feeling, the interior being treated much after the manner of a Roman basilica, having broad nave and aisles with an arcaded clerestory. The cupola, 165 feet above the ground, is reached by eight elevators which themselves form a part of the transportation exhibit. The main entrance will consist of an immense single arch, encircled with carving and bas-reliefs, treated entirely with gold-leaf and studded with incandescent lamps. This entrance will be called the "Golden Door."

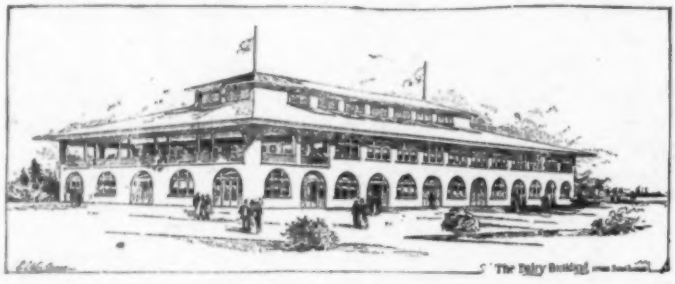
Directly opposite the wooded island lies the Horticultural building, by W. L. B. Jenny. It is 1000 feet long by 250 feet wide, consisting of a large central dome of iron and glass, connected by front and rear curtains to end pavilions, so leaving interior open courts for out-of-door floral culture. Plants, flowers, seeds, fruits and vines will be found here. The island, as seen on the map, is entirely surrounded by lagoons, contains no buildings, but will be treated as a primæval forest or tropical wilderness, thus being in itself much of a horticultural exhibit. Extensive terraces and flower-beds will border the lagoon, and in connection with the island will furnish a very extended natural display. The Woman's building stands directly opposite the end of the Midway Plaisance. It is the work of Miss Sophia G. Hayden, the design accepted from a competition open to women only. It is in the Italian Renaissance, 200 by 400 feet, and will contain specimens of women's handiwork of all kinds, model kindergarten, reforms and charities, and a model hospital. A bureau of information, library and record room, and committee parlors for gatherings will be found on the upper floors. The junction of the Plaisance with the park will mark the site of the Columbian Tower, 1150 feet high, the design of George S. Morison. There is still considerable doubt as to whether it will be built.

On the Midway Plaisance will be placed the special exhibits, such as a series of historical buildings, reproductions of villages, and streets. A continuous moving sidewalk will traverse the entire length. At the head of the lagoon on the north we have the Illinois State building, 400 by 150 feet in classic design, with a large central dome. This building lies in the present improved portion of the park, which is reserved for State and foreign exhibits. Space has already been allotted and the States and foreign governments may erect buildings in combination or separately, as they see fit. These buildings will be designed by architects appointed by the State commissioners. Here, too, we find the Art Galleries, 320 by 500 feet, designed by designer-in-chief Atwood. They are of pure Ionic architecture, containing a nave and transept 100 feet wide and 70 feet high, at the intersection of which is a dome 60 feet in diameter, surmounted by a colossal statue.

The Fisheries building, by Henry Ives Cobb, consists of a central main exhibit building 163 by 363 feet with curved arcades connecting with two round pavilions at the ends, each 135 feet in diameter. These will contain the aquaria

THE WOMAN'S BUILDING.

and angling exhibits, immense tanks providing for a very extended display of large and small fishes, and all animal life of fresh and salt water. The building is Spanish-Romanesque, color being freely used in the design. The roofs are of Spanish tile and glass. Across the arm of the lagoon is the United States Government building, 350 by 420 feet, surrounded by camp and field equipments, the Army and Navy exhibits, lighthouse, life-saving station, and shore battery. At the lake shore, protected by a pier lies the Naval exhibit, consisting of a coast line of battle-ships of the first class, and it is hoped that the United States ship *Michigan* will be anchored here during the Fair.



The Dairy Building

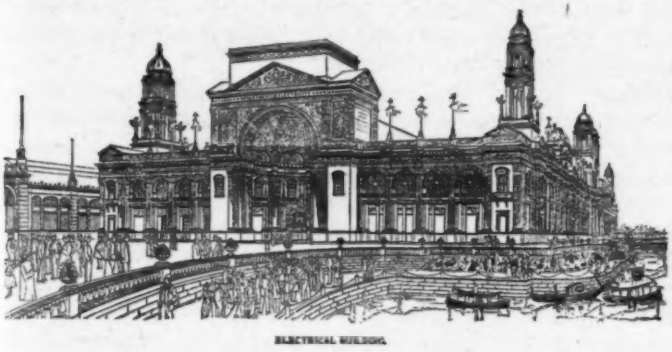
This completes a hasty review of the buildings as designed up to the present time; as comprehensive a view as can well be given in the limited scope of this paper. The long beach and walk along the entire shore, the stone bridges across the lagoons, the grand entrances, the walks and balustrades lined with vases of flowers, can be but mentioned as parts of the whole scheme for beautifying every square foot of the grounds. As to the construction of these large buildings there is perhaps little to say of general interest to architects and engineers, beyond the special features of construction already mentioned. The Bureau of Construction recognized the fact that the attention of the public is much more concerned in the external appearance than in details of interior construction. Hence it is that our "construction" may differ considerably from an engineer's standpoint of a permanent structure, and yet, remembering that *all* of the edifices must be immediately removed at the close of the Fair, the policy of providing a larger and more comprehensive exposition by means of cheaper construction, will certainly conform to the American idea of "making the best show for the least money."

The construction is almost entirely of wood, with the exception of the large trusses and dome already mentioned. The ordinary trusses are "combination," all exterior walls being built entirely of wood, covered and protected by staff. Staff was invented in France, being used largely in the construction of the Paris Exposition of 1878. It is composed chiefly of powdered gypsum, other constituents being alumina and glycerine. These substances are mixed with water without heat and cast in moulds made from the clay models. The color is a milky white, the permanent effects being produced by external washes. All the coloring of the building is under the directions of a chief of color. The casts are shell-like, about half an inch in thickness, and can be made in very large sheets being nailed directly to the wooden construction, and then colored as desired. They are made in all conceivable forms to imitate cut stone, rock face, marble, moulding and carvings. For the lower portions of the walls, which are exposed to rough usage, the material is mixed with cement, thus making it very hard. Staff is impervious to water.

The foundations are nearly all of the "spread-foundation" type, consisting of a bottom layer of three or four-inch planks, on which rests transverse layers of timbers, figured for the proper load distributed at a ton and a quarter per square foot of ground surface. The sand found

HORTICULTURAL BUILDING.

at the site may be considered as practically incompressible, except in a few instances where piles are used. The main floor loads have generally been taken as very heavy to allow for exhibits of great weight. All of the large buildings have been designed with a view to realizing as much as possible at the close of the Fair, in way of salvage. Floor joists of marketable sizes, window glass, iron roof trusses and domes will all be turned to the most practical



ELECTRICAL BUILDING.

account. The total salvage is estimated at more than $3,000,000. The work is being pushed rapidly at present, and will be carried on by two or three gangs of men working night as well as day, by electric light. Work is well under way on all of the main buildings, and the management entertain little doubt that they will be fully completed in time for the dedicatory exercises in October, 1892.—*The Engineering Magazine.*

Rubber-Gathering on the Rio Negro.

IT seems that the method of gathering rubber north of the Amazon is somewhat different from that practised on the great river itself and its southern branches, which perhaps accounts for the trouble that manufacturers have with the gums coming from some localities. A traveller on the Rio Negro thus describes his visit to the hut of a rubber-gatherer:

The hut was open on all four sides and was situated close to the back of the stream. About the only furniture in it was a couple of hammocks roughly made of cord, a few home-made earthen pots. About the middle of the floor and around the cabin, sprawled a half-dozen naked children and a number of hungry-looking dogs. The owner of this property was at that time, which was in September, working about a hundred trees. These trees are smaller than the Amazon rubber tree and are called *Seringueira;* they are known from other forest trees by the peculiar glossy green leaf. From the stream through the dense thickets of low-lands the rubber-gatherer had cut narrow paths and had tapped all trees that were within reach. In tapping the tree he made a little trough around it from the pith of the Miriti palm, and above this made the incision, and when the sap had run down into this trough, he let it off into a little earthen pot. The trees do not give out much sap, from two to four tablespoonfuls only coming from each. It had a sweet agreeable taste and the little Indians dipped their fingers in it and sucked them with avidity. Instead of using palm nuts for smoking the rubber after it was gathered, the Indian used any kind of hard-wood smoke and made up the hams on a paddle just as the Amazonian Indian does. Whatever rubber dried and hardened upon the tree was afterward pulled off and sold as second-quality rubber.

A Secret Compound from England.

A QUIET, gentlemanly Englishman, apparently about forty-five years old, has been a recent visitor to the rubber-clothing manufacturers in the United States and Canada. He carries with him three balls of composition, one blue, one black and one vermilion, and by the application of a gentle heat, is able to produce on the surface of rubber clothing very beautiful, brilliant and permanent colors. The secret of the composition that affects these changes is one that remains locked in his own breast, and the only key that will unlock it was a check for $25. Being a man of good address and apparent intelligence and sincerity, he seems well calculated to dispose of an article of this kind, and indeed his compound must be of some value, because it seems to have been purchased by the majority of the rubber clothing trade in this country. In addition to the cash paid for divulging the constituents of the secret compound, the following agreement is exacted by him:

"I hereby agree to pay H. Playter the sum of $25, in addition to the same amount this day paid him for his formula for making Elastic Oil Proof Composition, if, after six months time I am making profitable use of it; otherwise this agreement to be void."

The directions for making Elastic Oil-Proof Enamel are as follows: "Take one pound good clear glue, one ounce oxide of zinc, commercial, one ounce precipitated chalk, one-half ounce dry white lead, three ounces glycerine. Make a paste of the four ingredients named in the formula by rubbing them up into a cream, then stir them through the liquid glue, while the glue is heated to about the consistency of syrup. Stir thoroughly, and it is ready for use in the white. Color if necessary with aniline any shade you fancy, or if you can use any dry bronze powders just enough to give it a bronze cast, and then add the aniline shade you fancy; or you can use any dry colors, such as vermilion, chrome or ochre, by first rubbing them up in a little methylated spirit or wood alcohol. You then get the benefit of them. This composition must in all cases be used warm, and can be reheated any number of times in a body, but in using with a brush, after using allow the brush to remain in the composition or in water to prevent it drying, as it is difficult to cleanse the brush again."

Retailing in New York.

A LYNN manufacturer several weeks ago opened a retail shoe store upon one of the principal thoroughfares in New York City, and he reports that thus far he has found the venture a satisfactory one. More manufacturers may be induced to follow in his footsteps.—*Boots and Shoes Weekly.*

THE EXTENT OF THE RUBBER-TOY TRADE.

THE toy industry of the world is located chiefly in Europe, and for good reasons it probably will remain there for many years to come. Like many other industries of Germany and France and Switzerland it can be pursued in the family, each member taking a part, and the art in that way is handed down from father to son, and a band of workers kept intact from generation to generation. The rubber-toy business is carried along with that of the main industry by association, and is an important item. Naturally, however, the sale of rubber toys is confined chiefly to the toy stores. The large toy house carries a full line of rubber playthings, while the rubber house would not think of keeping in stock any article which did not have the gum for one of its characteristics.

The business can be said to be a peculiar one. It is subdivided roughly into the making and sale of balls, rattles, dolls, and figures. The variety is large and difficult to state with approximation to accuracy. The business in balls runs high in numbers, and in animals and figures the variations in form allow of extended recitals in the ordinary catalogue. While the business is closely allied with that of toys in general, and large numbers have been and are now imported, it would not by any means be correct to state that American manufacturers are idle in this respect, and in one case most commendable zeal has been displayed and excellent results obtained in transplanting the industry to this country. The importers of toys speak very favorably of the American manufacture, and are disposed to favor it in a business way whenever practicable. The New York Rubber Co. for years have been building up the industry, meeting with much success in the quality of their goods. The Lambertville (N. J.) company make large quantities of balls and rattles, selling their goods on their merit, and making no special attempt at competition in prices.

The European article is made often of inferior stock, easily torn, and lasts for so short a while that a business principle in the general toy trade to get rid of your stock at once is enforced in these goods, both in spirit and letter. For instance, one large importing-house which ordered the usual amount during the summer from abroad has not a single toy left, and never carries one beyond Christmas. In defense of these cheap goods it is stated by importers that the ordinary child soon tires of his toys, that his education is progressive in this age, requiring a variety of playthings, and economy is best subserved in making a cheap article rather than a more durable and higher-priced one. A couple of generations ago, before the idea of rubber toys had been conceived, the handing down of playthings from an older child to a younger was successfully and invariably practised, but this custom has passed away, and in rubber would be hardly practicable. In figures a retention of the industry by the Germans and more especially the French occurs more readily for the reason that a full assortment of molds requires large capital, and the Europeans have been in possession of the trade of the whole world for so long a period that it is not easy to wrest it from them. With facilities for meeting every requirement of fitful, popular fancy, and being in touch with it, they easily set the pace, a difficult one to follow. Then in painting animals they are adept, and thus make a very pleasing toy.

In everything else, however, importers say that the domestic manufacturers are gaining rapidly, while the volume of their own importations is steadily retrograding in spite of a natural increase in the population of the country. The competition so far as prices are concerned is severe, there having been through some misunderstanding a reduction in the tariff. Dealers state that should the industry abroad get into a shape that would allow of a reduction of 10 per cent. in the cost of making, or should conditions compel an advance here of 10 per cent., it would throw the tide strongly in favor of the foreign manufacturer. The value of the rubber-toy industry is unknown, but when the manufacture in this country is limited to two or three companies of importance, and the importation to less than half a dozen large houses in New York, with a few scattering concerns outside, and in any one of them only a few shelves are devoted to it, it cannot be said to be remarkable in extent. Among 65,000,000 of people, a third of whom are children, it is curious rather that the industry should be of so small proportions.

In balls there are velours—a comparatively new article covered with a flock or cloth-like surface and made of fine rubber inflated. They are made in solid colors, are very light and pretty, and some of them are eight inches in diameter. Inflated balls of the ordinary sort are made in colors also, and their rich contrasts make a very handsome toy. In addition to being colored they are fluted, or have raised stars on them, some with grotesque figures, others acrobatic or comic. These are also of large size, and are often musical to the extent of a low whistle, more pleasing to the untutored ear of the infant than that schooled in the philharmonic. Hollow balls are called white bat and gray bat. Solid balls are a lively article in trade, and are sold in gross lots. The little jackstone balls, not so well known, are only three-quarters of an inch in diameter. Sponged-rubber balls are more expensive. These balls recall the art practised by boys who by constant pricking of a small cake of rubber and stuffing the interior from time to time with small pieces, made after much patience and labor a full-sized ball which was covered with yarn and then with leather, making a bounding sphere, and especially well-known a quarter of a century ago.

Rattles are in great profusion as to style and form, some of them moulded in handsome figures. In doll heads, full lengths, black and white, dressed or otherwise, cloth bodies with rubber heads and so on, it is impracticable to give a reasonable description in a single article. A doll well dressed, in waterproof garments, of course, can be

gotten up in so good a shape as to make the dullest infant coo with delight, at $3.85 per dozen at the outside, and little things hooded, and swathed, looking not unlike the pappoose come at 82 cents per dozen.

In figures the list is an interminable one. Such idiosyncrasies as "clown on the moon," or a "girl in a catskin," have an insinuating way of ingratiating themselves into the good graces of children, and new ideas are always coming to the fore. Still everything has a crude, clumsy look, the common idea being that the child cares little for nicety in form. Take the child of educated parents, give him the nicest and most costly presents, and he will invariably desert them all for mud pies, pebbles, or some other homely diversion.

Few radical novelties appear. This year figures are made to jump, wrestle or somersault by a pneumatic principle operated with the bulb and tube at a distance. The season of the toy business is naturally terminable with the holidays. The winter, however, calls for a greater sale of playthings than when the child can be out of doors digging in the earth. Articles are generally sold in dozens, but so many as 96 dozen can be packed in a case, which implies the quantities that can be taken. It is probably a business that will continue to grow in volume as the necessities of education for children assume higher standards.

The Trade in Rubber Foot-Balls.

THE rubber foot-ball is claimed by domestic manufacturers to be peculiarly an American institution, very few if any being made abroad. In this country there are four manufactories which pay attention to this business, one in New York, two in New England and one in the West. In New York, the Hodgman Rubber Co. report that the demand is constant, and that portion of their factory devoted to this product is busy every working-day. Although they have compiled no statistics of the trade it is one of large proportions, sales being made in every section of the country. Orders for single lots are heavier than would be at first imagined. The younger members of this firm do not remember a time when the rubber foot-ball was not manufactured, and say that the industry was founded by their grandfather, the impression being that it was shortly after the close of the Civil War, if not during that period. Before that time the schools at which foot-ball was played had recourse to the old leather case which enclosed and was laced over a bladder obtained from the slaughter-house. A supply of these was generally kept on hand, but in the event of the bladder bursting without a second as a substitute the game was usually suspended until the boy who had the "pull" with the butcher could obtain another. In the interim were dull days for the school-boy, as in some places animals were not killed often and for one to be butchered especially was out of the question. This kind of ball is used still to a limited extent, but finds hardly enough demand for it to be kept in stock.

The game of foot-ball is now of such widespread interest that much pains is taken with the ball for college use. It has an oval form, is made of the best rubber with a pipe attachment for inflation, and is in turn encased in a stout cover, and laced. Such a ball is termed the "Rugby," and is made in one size, nine inches in diameter, and usually retails for about $4. As it is the *piece de resistance* in the contest it is usually treasured with care when idle although its usage is not by any means of a tender character on the field.

The ordinary foot-ball comes in six sizes, respectively six, seven, eight, nine, ten and eleven inches in diameter, selling for $15 to $30 per dozen. This ball is carefully made of Pará rubber and is nearly round, with a slight depression "at the poles," so to speak. The ball is made up in segments, usually six of them on the inside, there being a cloth surface, and cemented together. At the poles is a circular cap of the same material, on which the maker if so disposed can inscribe his name, or as in the case of the Hodgman Company, a handsome monogram. There is not a single stitch in these balls, and the workmanship is of such a character that when one of them is returned as defective a black mark is made on the annual calendar of the general office of the factory. In all the years the number returned has been three in a product of thousands upon thousands of dozens.

The ball is inflated by means of a small hollow tube called a key which fits into a cylindrical valve in the inside of the sphere. For transportation the deflated balls are packed closely in nests, taking but little room. A chief point is to get strength with light weight, great objection being made by teams to a heavy ball, which rolls sluggishly over the ground. The color of the undercase of the Rugby ball is white; the ordinary is black.

The great impetus given to the game bids fair to make this industry even more prominent than it has been in the past, and another season probably will see a much larger output than ever before.

Increase of the North Borneo Gutta-Percha.

THE British Consular reports contain comparative figures relating to the exports from British North Borneo during the six years, 1885 to 1890, both inclusive, from which there is no apparent falling-off in the extent of the production of gutta-percha. The value of the exports of this gum, and also of India-rubber, is given as follows:

	1885	1886	1887	1888	1889	1890
Gutta-percha...	$34,747	$25,442	$26,902	$28,929	$24,906	$54,448
India-rubber..	8,535	23,417	26,418	18,698	21,581	21,530

It is stated that a new influx of labor and capital to the region covered by these reports is being experienced, in consequence of which larger returns are expected for the future.

A PULLEY designed to prevent the slipping of belts has at intervals upon its face rubber strips with rounded surface and fastened by projections passing through the rim of the pulley. These strips lessen the wear of the belt reducing friction to a minimum.

Asbestos and Mineral-Wool.

IT has been suggested that more is said in the public press about asbestos than so small a subject deserves. If, however, the writer knew how widely this mineral is in commercial use to-day such a confession of ignorance would not have been possible. There are very few American industries to-day that are not in some way dependent upon asbestos in one form or another. Mills, workshops and factories use great quantities of it. In the form of cloth as a protection against the burning of the face and hands it has greatly lessened one of the dangers in working over molten metals. With a pair of asbestos mittens on his hands the metal-workman can grasp hot irons and crucibles, in fact anything that is heated almost up to white heat, without perceptible discomfort. It makes an excellent mask for the face, and the heat from the hottest fire does not penetrate it at all.

These masks are so arranged that the air can be drawn from the side that is away from the fire and smoke, and breathing is therefore easy. Not only are mittens and masks made, but aprons and other clothing constructed, having all the heat-resisting qualities that can be desired. Plumbers are to-day using it largely for joint wiping, and smelters, molders and workers in metals generally, are warm in its praise.

To those who are not familiar with this strange mineral, the first thought would be that a pair of asbestos mittens would be so stiff and hard that they would be of little use. This, however, is not so, as they are very flexible, and even small objects can be picked up with ease. A great variety of curious names have been given to asbestos; in Germany it is called stone-flax, and sometimes salamander's wool, from an old belief that it was actually made from the wool of the fabled salamander, which creature was able to sport in the fiercest flames. The Canadian name was cotton-stone and it was also known as mountain-stone, mountain-cork, mountain-flax, these names being derived from the variety of appearances it presents.

The art of spinning asbestos is not an old one, as it was invented in 1879 by an Englishman, John Bell, and his machines were the subjects of patents in that year. The spun asbestos, for engine-packing on the British warships, was so useful that he formed an asbestos company and has made a fortune out of it. An article exceedingly like asbestos is known as mineral-wool, and it is to-day largely used in the construction of houses, principally as a fire-proof non-conducting packing between the floors and ceilings.

Mineral-wool is produced by sending blasts of steam through molten slag, which reduces the fluid metal to a fibre, which is similar to the fused glass that is spun into glass-silk.

Nature's laboratory has manufactured something very like this in the volcanoes of Hawaii. It is said that in various parts of the islands there are filaments of stringy brown lava very much like spun glass, which are so light they are caught up by the wind and blown about. This substance, which is known as Péles's hair, is of a rich olive green color and is extremely glossy, and is, moreover, very brittle. When the volcanoes have been active a fiery spray is thrown high in the air, and the sea breeze catching it, has carried it far away over the high lands, spinning it into threads which the birds have picked up and used as linings for their nests. In many places in the highlands of Hawaii may be found handfuls of it clinging to the rocks, miles away from the volcano. This natural mineral-wool, however, has none of the toughness nor commercial qualities that pertain to that which is made by man.

Mechanical Uses of Unvulcanized Rubber.

THERE are used in the leather-shoe trade annually many thousands of barrels of rubber-cement, which is of course unvulcanized rubber in solution. A number of manufactories are run particularly on this sort of work, and their output to a large degree is sold directly to the leather-shoe manufacturers. The process is a simple one, Pará rubber being used and benzine being the solvent. In order to get the finest, lightest and cleanest cement possible, the outer skins of the hams of Pará are taken off, and the inner part, after being stripped and separated into as many parts as possible, is soaked in benzine until it is very much softened and has increased its bulk about four times. This is then put in a large churn run by power, and a little resin is added to increase the sticking qualities. It is then stirred for a number of hours, more benzine being added from time to time until a homogeneous mass is obtained, after which it is barreled and sent to the shoe factories.

A small outlet for this sort of cement is found among photographers for sticking purposes, to whom it is sold after having been very much thinned by the addition of more solvent. For repairing purposes a cement is used to which has been added a little lamp-black and a certain quantity of litharge for the purpose of drying after it has been applied. Another form in which unvulcanized gum is sold is that of various packings that are to go in places heated by steam, where the gum after being put into place is slowly vulcanized and has a certain life added to it by having missed the first process of vulcanization.

What is known as cut-sheet is used largely in this country and abroad. It is nothing more or less than pure gum which has been massed upon a mixing-mill and afterward put in a rectangular iron box and pressed into a solid cake. This box is fitted with a traveling arrangement something like that of a planer, so that the cake of rubber can be slowly fed out of one end against a small revolving knife, which cuts it into the thinnest possible sheets. These sheets are used in making balloons, tobacco-pouches and articles of that kind. It requires no little skill to make these goods from unvulcanized rubber. To make a perfect sphere, it is a matter of common knowledge among balloon makers, that no number of pieces less than seven can be used. The pattern cutters may use nine, eleven, thirteen or fifteen pieces, always going on the odd number, as it is claimed that a balloon made of eight, ten or twelve pieces would not expand evenly.

Goods made of cut-sheet are usually cured by the cold process or by the vapor cure, and in some cases are used without any vulcanization at all. Formerly India-rubber thread was made of gum treated in much the same manner as the cut-sheet, and a great deal of skill was attained in its manipulation. These threads were made so fine that from 7000 to 8000 yards of one kind would weigh only one pound. They were used not only in suspender webs and goring, but in Jacquard looms in place of webs, in some looms as many as 3000 of these threads being used.

The Supreme Court Decides a Packing Case.

A SUIT in equity was brought several years ago in the Circuit Court for the District of New Jersey, by the New York Belting and Packing Co. against Allen Magowan, Spencer M. Alpaugh, and Frank A. Magowan, to recover for the infringement of a patent granted Dennis C. Gately and assigned to the above company, for improvements in vulcanized India-rubber packing. The Court, after reviewing the patents and testimony, found for the plaintiff for $9026.66 profits, and $742.05 costs, upon which the defendant appealed. The Supreme Court, after going over the evidence, confirmed the decree of the Circuit Court. It is interesting in looking over the various patents that were submitted to see how many have been issued for packing, and what their special features are. To begin, the Gately patent was founded on improvements that were made on the McBurney patent of 1859, which was for an improvement in packing for stuffing-boxes of pistons. In his specifications McBurney gave a compound which perhaps to-day would not very often be used; it consisted of 25 pounds India-rubber, 2 pounds sulphur and 4 to 8 pounds silica or plumbago. This was coated upon the fabric and formed up into plies, after which it was united by heavy pressure or by rolling and the packing was then vulcanized. To prepare it for use it was cut diagonally into strips, and afterward bent into the shape of rings. In brief, the McBurney patent was for packing alternate layers of canvas and India-rubber, the whole vulcanized into one homogeneous mass.

The Gately patent was founded on the theory that the McBurney packing was far too rigid to operate satisfactorily in all conditions. The stuffing-box could not force the packing with such tightness against the piston-rod that a tight joint would result. Gately therefore backed his packing with pure gum free from the layers of canvas, which, when compressed, made an exceedingly tight joint. Among the patents brought up by the defendants were the United States and English patents to Kierby. The method involved differs from the Gately packing, in that its wearing surface is not entirely on one side of the strip of rubber which gives elasticity to the packing, but the rubber is in the center of the portion which is to be subjected to the wear of the piston-rod The Wise packing was similar to the Kierby but had an exterior metallic armor which was said to take the wear of the piston-rod. The McLean packing consisted of vulcanized rubber and cork, the two parts secured by a metal strip which was wound around both the cork and the rubber. The Tuck patent of 1852 showed canvas coated with unvulcanized rubber.

The Tuck patent of 1854 shows nine forms of packing, none of which are vulcanized, all of which consist of a rubber core with canvas rolled around it. The Tuck patent of 1855 shows five forms of packing, which are in substance copies of the five examples shown in the Tuck English patent of 1854.

One of the strong points made by the plaintiff was that when the Gately packing was put on the market, while its price was from 15 to 20 per cent. higher than other packings, although it cost 10 per cent. less to make it, it went into such extensive use as to practically supersede packings made under other methods.

A Natural Hard Rubber

A GREAT deal has been said about various deposits of elaterite, commonly called mineral hard rubber, that are found both in this country and in Europe. It is perhaps not generally known that the best substitute for hard rubber in many cases is not a mineral imitation, but an animal substitute, which is every day growing scarcer, while the price is appreciating so constantly that before long vegetable hard rubber will supersede it. This animal substance is known as baleen, or more commonly whalebone, and is taken from the right whale, which lives in the Arctic Ocean. The bone of commerce comes from a sieve-like arrangement which this animal has for helping gather its food. It is hung suspended from the upper jaw and the pieces of bone are in lengths from six inches to ten and twelve feet, and from three to fifteen inches in width. As it grows down from the upper jaw it is exceedingly flexible and can be moved in almost any direction at will. The food of the right whale is an oily substance of dark red hue, which often covers square miles of the ocean. This the creature absorbs in vast quantities, and while holding hundreds of barrels in its mouth expels the water through the whalebone sieve, retaining the oil and swallowing it. After the whalebone has been secured, which is not always an easy matter, it is cut into strips, steamed, straightened, squared and tapered, particular care being taken if for use in whips. The bone when finished is worth about $10 per barrel, and one large whale will contain about $30,000 worth of bone. Owing to the increasing scarcity of this bone manufacturers have been looking for a substitute for it for years, the nearest approach to it being semi-hard rubber. Another substitute that is spoken very favorably of is solid rawhide, but it has faults that have prevented its general introduction. Goodyear spent a deal of time on the production of what he called artificial whalebone and achieved good results. While the genuine whalebone is to be had, however, it will probably be considered superior to any imitation, however good.

HIS HONOR.—What made you steal this gentleman's doormat?

Prisoner.—Sure, yer Honor, it said "Welcome" on it, in letthers as long as your ar-r-rm.—*Puck.*

Trees and Lasts Abroad.

To the Editor of the India Rubber World:—In your November issue, in an article on "Making Rubber Shoe Lasts," you allude to the use of metal, saying, "metal has been used to some extent, with it is said good results," leaving the impression that the use of metal trees and lasts was but little known to the manufacture of rubber boots. In most of the larger English and German manufactories metal trees and lasts are almost wholly used in place of wood, the advantages being numerous. As wood, owing to the constant heating in the process of vulcanizing, crumbles and splits so that its life is only from one year to one and one-half years on the average, and that of the metal without limit, the latter is far more economical. There is also the further great advantage in maintaining the sizes of boots, which is very much to the advantage of the retailer, and therefore to the manufacturer. In this country they are not generally been adopted, mainly on account of the weight. In England and German factories they use heavy cast-iron trees and lasts, but the manufacturers there are not so thoughtful of their help as in this country. Here quite a number of experiments have been made in order to get the trees light and thin, and trees are now produced of malleable iron not heavier than the wood trees now in use. F. C. T.

New Haven, Conn., December 10, 1891.

Some Chemicals Used by Rubber-Men.

Bisulphide of carbon, used so largely in the vulcanization of India-rubber, is usually made by the melting of sulphur by placing it in contact with burning charcoal. The vessel being tight, the sulphur forms into a vapor, which at a high temperature unites with the carbon and readily passes off into a second vessel kept very cool, when distillation takes place. It is again distilled at a lesser heat and the result is a transparent, colorless liquid, which emits a strong odor peculiarly unpleasant when it is adulterated. It freely dissolves sulphur, depositing in turn crystals, and will also dissolve rubber, camphor or phosphorous, and mixes readily with oils. In its use for vulcanizing rubber it is claimed that it produces a more durable article than sulphur, it being very light and volatile. It is often adulterated with benzine, in which case it does not test up to a proper capacity. If it is not properly distilled the odor spoken of is especially offensive.

A test of it can be made by dipping the finger into the liquid and holding it up to the nostril, when it readily evaporates, carrying the odor of tar with it. Should it be faulty, however, the odor remains on the finger for a longer time and an inferiority in the product is detected. In addition to the vulcanization of rubber, it is used in leather cement, and in late years has been used largely by farmers for killing insects and vermin. In the latter use an inferior article is admissible, but among rubber-men the best is demanded. The usual price for it is ten cents per pound.

Another substance used to some extent by rubber-men is alcannin paste. It is not made in this country but is imported. It is obtained from the alkanet root, and, probably, as the name would indicate, originally came from Arabia. It is still grown in oriental countries, and is cultivated largely in France and elsewhere in Europe for purposes which are rather astonishing to the pure and simple mind. It is largely used for coloring port wine, butter and some other food substances. It is not called dangerous when used in this manner, minute quantities being used, a deep, fast pink color being the result. In coloring India-rubber, for which it is said to be admirably adapted, the gum can be made light or dark, according to the extent of its use. While the article itself is worth $6.50 to $7 per pound, a minute quantity only is necessary, and the paste is not, in that sense, costly. The toy balloons sold on the street are colored with this substance and a good idea of its bright rich tint can be obtained from their appearance.

Chloride of sulphur is another chemical largely used in connection with vulcanization. The principle of its manufacture is to pass dry chlorine over the surface of sulphur in a melted state in a glass retort with a condenser, producing a deep orange yellow liquid with a disagreeable odor. The chloride of sulphur and the bisulphide carbon are variously compounded to produce desired results. Different grades of chlorine are produced in different ways—by double distillation, and so on. It sells from 35 to 85 cents per pound.

There are no Transparent Hard Rubbers.

To the Editor of the India Rubber World:—Is the Vianese artificial amber an India-rubber product? I have been told so, and if so would like to learn what company manufacures it, or, if it is not a secret process, would like to know how it is accomplished. D. M. L.

Rochester, N. Y., November 25, 1891.

[Artificial amber is really a product of ordinary resin. It is so transparent that any one at all acquainted with the India-rubber business would know that it could not be any form of hard rubber. The process of manufacture is to treat the resin with turpentine and some alkaline substance that shall not only harden it, but in a measure increase its brilliancy. It is very easy to distinguish it from natural amber, as it melts with greater readiness, and if put in ether or alcohol will be affected very readily, while amber is affected but slightly. None of it is manufactured in the United States and but little abroad.—Editor.]

Locating a "Pound."

An excellent way to discover the whereabouts of pound about an engine is to place the end of a piece of rubber hose to one ear and the other at different parts of the engine. Sometimes it may be necessary to stop up the other ear, as sound travels in a very deceptive way. Some engineers put the end of a thin pine stick between the teeth, and let the other end touch the suspected part of the engine. We have always found the hose quicker and more reliable.—*Boston Journal of Commerce.*

Recent Rubber Patents.

NO. 462,278.—Steam-Joint Packing. Edward L. Perry, Paterson, N. J.

A steam-joint packing consisting of a hollow core of cotton-duck or other woven fabric, a covering of elastic material, and a coupling, the ends of which enter the ends of the packing.

No. 462,464.—Hose-Coupling. John Balmore and Edward E. Gold, New York, N. Y.

In a hose-coupling, reciprocal coupling-heads having locking projections for coupling them together, and projecting seats at their abutting ends, and reciprocally-interengaging male and female guides projecting from the end faces of the heads on opposite sides of the seats to an extent not exceeding twice the projection of the seats, whereby the guides engage during the act of coupling and direct the seats and locking projections into proper relative positions, while the projecting guides do not interfere with either head being coupled with a similar head devoid of such guides.

No. 462,725.—Cores for Pen-Holder. William H. Cook, Philadelphia, Pa.

The combination, with the holder-body, of an elastic or yielding sleeve thereon, a cap at the upper end of the body, having a flange overlapping the sleeve, and a tube at the opposite end of the body, having a rearwardly-projecting flange inclosing the adjacent end of the sleeve.

No. 462,681.—Electric Conductor. John A. Barrett, Brooklyn, N. Y., assignor to the Standard Underground Cable Co., Pittsburgh, Pa.

The combination of a conductor, a fibrous or meshed air-containing serving about the conductor, an envelope consisting of a strip wound about the served conductor and sized with a material that is adhesive when moist and flexible when dry, and sealing material outside the envelope.

No. 462,763.—Teething-Bit for Children. Peter Grabler, Pittsburgh, Pa.

A teething device for children, made of soft rubber, and a metallic plate having the depending hooks which take into the soft-rubber base.

No. 462,766.—Bottle-Stopper. Morris Herzberg, Chambers County, Ala.

In a device of the class specified, a cork, a tube passing through said cork, and an elastic sack surrounding said tube adapted to be drawn over and close the top and form an expansible chamber.

No. 462,815.—Valve for Pneumatic Tires. William Heale, London, England

The combination, in a valve for pneumatic or air-inflated tires, of the rubber inflation-tubes having a turned-over end, forming a seating for the valve, the flat plate-valve adapted to rest on the said seating, and the rubber strips passing at right angles to one another through holes formed in the said plate-valve and adapted to hold down and confine the said valve on its seating.

No. 462,892.—Life-Preserver. John Corbin, Sparta, Mich.

A life-preserver composed of a single flexible band adapted to be secured around the chest and under the arms of the wearer and provided with separated and independent bulb air-chambers adapted to be inflated and expanded only on the back and in the front of the wearer, a reduced portion or neck between said chambers, and a narrow air-passage between the walls of said neck and communicating under the arms with the front and back air-chambers.

No. 462,902.—Lawn-Sprinkler, Melville D. Jones, Somerville, Mass.

In a lawn-sprinkler, the combination, with a fixed tubular portion for a water-supply, of a hollow revoluble head having a plurality of perforated arms adjustably connected therewith and thus adapted to be turned in a plane at right angles to that in which the said head rotates, said arms being arranged about said head at all sides thereof, and being thus adapted to throw the water in all directions radial to said head, whether the latter be in revolution or not.

No. 462,950.—Overshoe. John F. O'Brien, Montreal, Canada.

A shoe having a sole and heel portion, a transverse strap connected to the counter on the inside only, slightly above the sole, whereby when in use the strap is depressed and the sides of the counter drawn in to compress the shoe.

No. 462,965.—Clothing-Protector. Catharine L. Darby, Stamford, Conn.

A clothing-protector the body portion of which is made from a single piece of waterproof material secured together by seams at the sides, said protector being provided tightly about the thighs, leaving a fullness between said leg-bands and being provided at front and back with straps for the attachment of the napkin.

No. 462,988.—Vaginal Syringe. George A. Ogrissex, Jersey City, N. J.

A vaginal syringe consisting of a body formed integral with a screw-nipple and a diverging inlet and outlet channels integral therewith, which opens through a screw-nipple at two different points, a bulb connected with the inlet-channel, a discharge spout secured to the screw-nipple in alignment with the inlet-channel, and a pearıform cup screwed upon the screw-nipple of the double-channel body having imperforate side walls, and its laterally-expanded vagina-distending extremity formed with a central receiving-orifice, the edges of which are remote from the spout for the free and unobstructed outflow of the injected liquid.

No. 463,068.—Hose-Holder. Joseph Moore and Ralph H. Moore, San Francisco, Cal.

In a combined hose reel and barrow, a reel mounted on a hollow trunnion at one end, having an upturned portion, the hose-section connected to said upturned portion and resting and held at its upper end in a circularly-adjusted clamp held upon the reel-stand, a connecting or coupling piece secured to the end of reel, a coupling-piece with enlarged end adapted to screw into a coupling-piece over the end of the tubular trunnion, and an elastic washer adapted to fit over the trunnion and between the end of the coupling-piece and casting.

No. 463,079.—Electric Conductor. Charles T. Snedekor, New York, N. Y.

An insulating covering for electric conductors, consisting of a rubber covering upon the wire, an adhesive substance upon the rubber covering, a powdered refractory material in and upon the adhesive substance, a covering of tape saturated with silicate of soda over said refractory material, a compound containing a refractory material upon the tape or braid, a braided fibre covering the compound, and a coating of asphalt or other water-proof material over all.

No. 463,107.—Electric Conductor. Frederick E. Degenhardt, Chicago, Ill., assignor to the Standard Underground Cable Co., Pittsburgh, Pa.

The combination of a conducting-wire, a strip provided with alternate depressions and elevations surrounding said wire, and a close cover applied outside of the strip.

No. 463,153.—Rubber Tire for Wheels. Earnest G. Hoffman, London, England.

The combination, with a rubber tire having a hole through its length for carrying a wire and a second hole for absorbing vibrations, of a wire threaded through the first hole, the ends of which are twisted together for the purpose of binding said tire to the wheel-rim.

No. 463,280.—Waterproof Blanket. Hosea W. Libby, Boston, Mass.

A blanket comprising a waterproof interior and a woolen covering secured to each side thereof, each of said woolen coverings having its outer side napped and its interior provided with loops, by means of which it is secured to the interior and interstices are formed between it and the interior.

No. 463,290.—Glove. James W. Begg, Chicago, Ill., assignor of one-half to James White, same place.

A glove having a receptacle in the palm thereof, consisting of a strip of flexible material attached upon all but one of its edges to the palm of the glove, the contour of the remaining edge corresponding with the contour of the edge of the palm extend-

ing between the attached sides of the strip, with the one of such corresponding edges of the strip and palm adjacent to the thumb of the glove attached thereon, thereby the location of the opening to the receptacle is made to correspond with the line of joining of the palm and thumb.

No. 463,512.—Electrical Conductor. Philip H. Holmes, Gardiner, Maine, assignor to the Holmes Fibre-Graphite Manufacturing Co., Chicago, Ill.

A hardened electric conductor composition composed of finely-divided plumbago, finely-divided fibre and a drying-oil as a binder to hold the particles of plumbago in electrical contact with each other.

No. 463,581.—Packing. Elias Missel, Stuttgart, and Leonhart Meyer, Feuerbach, Germany.

A packing washer or ring for stuffing boxes, consisting of an inner greased band of hemp, silk, cotton or asbestos, over which is wound until the desired diameter is obtained a continuous band of absorbent paper, made from hemp, silk, cotton or asbestos fibre, prepared and saturated with a mixture of tallow, talc, mica and graphite.

No. 463,734.—Shoe. Fred. H. Flagg, Worcester, Mass.

A congress shoe having a side-gore consisting of a single piece of elastic fabric which is cut or slit vertically from its top downward nearly, but not entirely, to its lower edge, and having its adjacent cut edges bound, and one of said edges being built out by the binding material, so that it will overlap the other, combined with ball-and-socket fastenings, the latter of which are attached to the outer overlapping edge.

No. 463,886.—Weather Strip. Lorenzo D. Blackwood and Moses A. Goff, Lathrop, Mo.

An improved weather-strip comprising an elongated metal portion or strip of substantially U form in cross-section, an elongated flexible strip having longitudinal parallel cuts upon one of its sides and inserted into the metal strip, and an elongated wooden strip also inserted into the metal strip and lying beneath the flexible strip.

No. 463,985.—Garter. Claus Freese, St. Louis, Mo., assignor to William Pfeifer, A. C. Erfort and A. C. Storck, all of same place.

A garter comprising a short piece of elastic material and buckles secured to each end thereof, the buckles each consisting of a frame having an opening for the reception of the end of the elastic material, a second opening for the reception of a portion of the garment to be held, a cross-piece between the openings, a depression in the center of the cross-piece, and a flexible tongue having its outer end secured to the outer end of the buckle-frame and its inner end resting in a depression, the flexible tongues at both ends of said elastic material having their points facing each other, and each located substantially in alignment with the center of said elastic material.

Horse-Blinders of India-Rubber.

TO THE EDITOR OF THE INDIA RUBBER WORLD:—Can you inform me whether rubber has been used in the manufacture of blinders for horses? It seems to me that something might be molded that would be much cheaper than the ordinary sewed leather blinders. H. F. H.

Nashua, N. H., December 1, 1891.

[A blinder of this kind is the subject of a patent granted Mr. Lewis Hoyt, of the Hoyt Rubber Co., Boston, Mass. He is able to make a very handsome blinder that is a perfect imitation in appearance of the leather article, even to the fine row of stitching that appears around the edge. Mr. Hoyt certainly has an excellent thing in this, but what arrangements he has made for pushing it we are not in a position to state.—EDITOR.]

Rubber Billiard-Cloth.

TO THE EDITOR OF THE INDIA RUBBER WORLD:—In the November number of your magazine I noticed an article on "Billiard Cushions." Some years ago I saw a cloth for billiard-tables made as the usual green cloth is made, except that on the under side it was coated with India-rubber, the idea being to keep the chalk from working through from the top of the table, where it would in time form a mat and make an unevenness. I do not know exactly what patent this was, but it seemed to me an idea that could be profitably employed at the present time. A MANUFACTURER.

Philadelphia, October 19, 1891.

Rubber-Bound Dishes.

TO THE EDITOR OF THE INDIA RUBBER WORLD:—In October last, as I came from Germany to this country, it being my tenth voyage across the ocean, it was exceedingly stormy. In the midst of the heaviest weather a thought came to me that perhaps may be of value to the rubber trade. The table in the main saloon during these storms was many times cleared of dishes by the violent motion of the ship, and the amount of crockery smashed in that one voyage was something enormous. Now why could not some enterprising American invent rubber dishes, or at least dishes with rubber packing that might be slipped around the edge in stormy weather? VOYAGER.

New York, October 11, 1891.

Early Knowledge of Caoutchouc.

IN these days of reminiscences of Christopher Columbus, it is historical to state that on his second voyage he found the natives of Hayti playing with balls made of caoutchouc. Spanish historians mention caoutchouc in 1615, having found it in Mexico and Nicaragua. The Frenchmen appear to be the first to discover *Hevea* of botanists, an engineer named Fresnau making careful researches, an account of which the Academy published in 1751, but the actual discovery of this species was probably by another Frenchman, some time previously, named Condamine. Another Frenchman, Aublet, supplemented the researches of his predecessors by describing fine Pará rubber.

A New Gutta-Percha Forest.

THE *Kew Bulletin* makes some pertinent comments upon the recent discovery in the forest of Bonket-Timah, near Singapore, of a supply of the most valuable species of gutta-percha trees, which were supposed to be practically extinct. This particular quality of gutta-percha, it appears, was in especial demand for submarine cables, and the ignorant natives exterminated the trees in their eagerness to supply the market. It is said that the commoner kind of gutta-percha trees will also disappear in a few years, if they are not protected in some way. The *Bulletin* regrets that the whereabouts of the newly discovered grove has been published, and urges the Government to take steps to preserve it before it is too late.

A NEW invention that will doubtless "go" next summer when the swimming season sets in again is a webbed rubber glove for use in the water. Young swimmers find one of the most difficult points to learn is to keep their fingers together in the water. With the webbed glove this will not be necessary, as the swimmer will then be web-fingered and can safely compete with the Newfoundland dog.—*Rochester (N. Y.) Times.*

NEW GOODS IN THE MARKET.

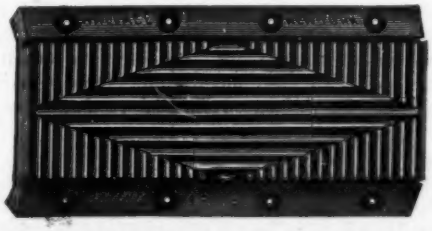
THESE illustrations represent the application of India-rubber to stirrups and carriage-steps. The stirrup, however carefully it may be made, soon becomes smooth and when that occurs it is more or less dangerous. On the other hand, with some device such as corrugated rubber fitted compactly into the stirrup, the danger of slipping is obviated and the foot is kept in proper position, not allowing it to lose its hold and also preventing it from sliding in too far. The rubber imparts a great elasticity to the foot, and in this way great ease is obtained in timing with a trotting horse. It is also of more even temperature than iron, neither chilling the foot in cold weather, nor heating it in the summer.

GENTS' PAD.

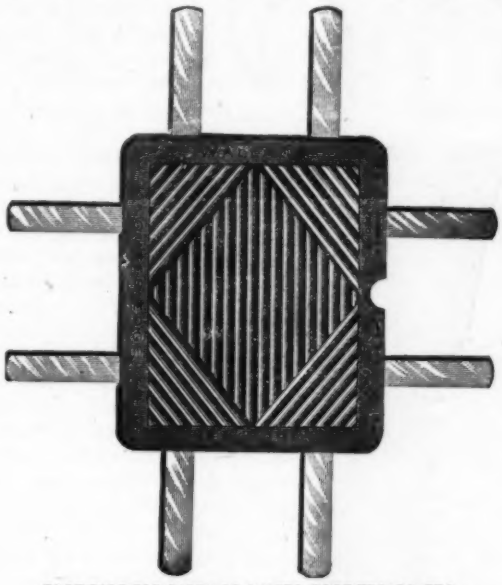
PAD ADJUSTED TO STIRRUP.

For ladies, in addition to other advantages, there is not so much trouble with it as is often occasioned by having to hunt among the folds of the riding-habit for a lost slippery stirrup. There is in short a maximum of ease, safety and comfort in this device which appeals at once to the rider, and is noteworthy from the fact that hardly any substitute would answer the same purpose. Its application to the stirrup needs very little description; the projecting pieces of metal are bent over the stirrup iron, thus making a very firm contact not readily loosened. In the application of these devices to carriage-treads, a direct advantage is at once observed. With some carriages, and in some states of the weather, there is always an attendant danger of the foot slipping, intensified by a contingency that the horse will move off at an inopportune moment. Then there is always a class of drivers to whom this device appeals with peculiar force—men constantly jumping off and on a wagon, a milkman for instance. It is represented that these pads are made of good rubber and in a durable manner, and will last for a reasonable time. They sell for, stirrups at $1.50 per pair, and for carriages at $2, per pair. The inventor is a gentleman fond of riding and devised the pad chiefly for his own convenience. Engrossed in other matters he has had little time to devote to placing them on the market and the pads have made their way into equestrian and driving circles by sheer force of merit.

LADIES' VICTORIA PAD.



FOOT PADS FOR CARRIAGE SHAFTS, FOOT TREADS, ETC.



FOOT PADS FOR CARRIAGE SHAFTS, FOOT TREADS, ETC.

They are now kept in stock by saddlery-hardwaremen and are being introduced by W. W. Brower, No. 16 Water Street, New York.

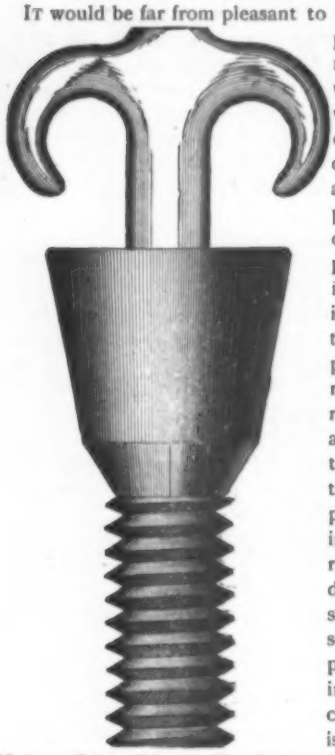
An Elastic Boot Heel.

SHOEMAKING as an art, has it seems, reached very near perfection, until when it comes to fitting feet of all shapes and sizes there is but little to be desired. But when it is a question of ease in wear and improvement in gait the inventor will find scope still left for the adjusting of scientific principles to the leather and thread combination which covers the feet. Swope's Elastic Heel, a new invention, is at once simple in construction, adjustable to any shoe. It is only an ingenious arrangement of a piece of pure rubber interposed between the layers of leather, the whole fastened together by a new method of nailing. It claims the following good qualities: It does away with the little sharp click of a high heel, and the blunt tap of a low heel; it is absolutely noiseless; it relieves all strain on the muscles and tendons, giving an artificial elasticity to the motion and lessening the sudden rise and fall of the muscles at the ankle it makes walking easy because less force is expended and one is conscious of less effort, thereby taking away the tired feeling

it is impossible to have a nail protrude in the heel to hurt the foot, and there is little, if any, wearing down at the heel. It is the invention of W. B. Manny and is introduced to the trade by Joel Swope & Brother, No. 311 North Broadway, St. Louis, Mo.

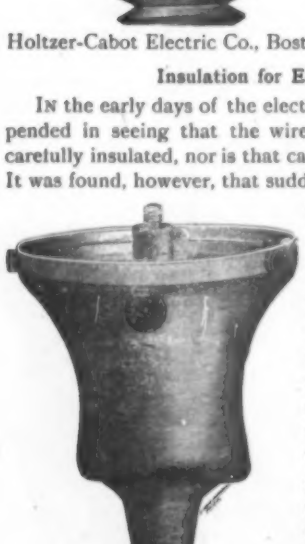
Hard-Rubber Insulator for Telephone Lines.

It would be far from pleasant to lean up against a telephone pole and receive even a mind current from the wires strung above. It would moreover be a serious loss to the telephone company if the current were at liberty to run down every pole; in fact were such the case there would be no telephoning. Good insulation is a necessity, if good work is to be done by these sound transmitters, and for this purpose there is nothing more suitable than hard-rubber. In the cut shown above is perhaps the best type of hook insulator in the market. The hook proper is made of malleable iron and is set into a hard-rubber cup which narrows down into a shaft. This shaft is threaded and easily screws into a telephone pole, put on side of a building, and keeps the electric current from escaping. It is manufactured by the Holtzer-Cabot Electric Co., Boston Mass.



Insulation for Electric Lamps.

In the early days of the electric light a deal of care was expended in seeing that the wire that carried the current was carefully insulated, nor is that care in any way lessened to-day. It was found, however, that sudden and painful shocks could be received even if the wire was properly guarded by the best of rubber insulation. A point of danger showed itself in the bases of the electric lights themselves. While no fatalities were caused by the current being diverted through contact with the lamp base, many accidents occurred. It therefore became a duty to guard against this by some simple form of insulation. The cut appended shows the most practical device of this kind. It consists of a piece of vulcanized India-rubber, molded into shape to fit the base of the electric light. As there are many styles of lamps a variety of shapes were needed, and for this the manufacturers have provided by making patterns and moulds, that allow them to produce bases of any shape or style that may be called for. These lamp bases are already widely known and endorsed by leading electricians the world over, as they afford a certain and complete protection against the possibility of an electric shock. Manufactured by the Electrical Specialties Co., Pawtucket, R. I.



Seen in a New York Rubber Store.

In the windows of the store of S. G. Watts on Third Avenue, New York, are two automatic scenes which he has imported from continental Europe and which attract a full amount of attention from the Avenue gamin and the curious passer-by. One of them represents an oriental snake-charmer who is playing soft music on his flute; appearing before him is a snake made of rubber as is some other portions of the figure, all parts of the scene moving in unison. The other scene represents a gang of divers at work in their suits among the denizens of the deep, the fish moving about them as they diligently prod their trident forks into the soft bottom of the sea. The scenes are moving ones and under glass, and are unique as attractions for a rubber store.

Mr. Watts reports an excellent trade in clothes-wringers this season, many large lots having been disposed of. The season up-town for toys has been a good one, the nicely-made balls of the New York Rubber Co. meeting with an encouraging sale. These balls are of very thin rubber and as light as wafers. A novelty this season in balls is a map of the earth outlined upon the surface. A globular representation of the different continents and oceans in this manner serves to create a correct idea in youthful minds which maps in books fail to give.

The Bissell Carpet-Sweeper people have christened one of their sweepers "Goodyear" for the rubber trade which Mr. Watts is introducing.

Gleanings in the Bicycle Trade.

The repairing of bicycle tires is becoming quite a feature in the different cities, and a few speak of it as a great mystery. In New York an up-town man who has been in the business for years tried to get some information from headquarters and was told that it was a great secret and required exceptional skill. A little disgusted he exclaimed: "Naphtha and gutta-percha and a thin shaving of rubber; there are men who can do that work in every shoe shop in the land." There will be a great field, in the dull hours of the winter, in the substitution of the cushion for the solid tire on wheels now in use.

One of the new pneumatic tires is said to be actually self-healing and is called the mackintosh. It will not stay punctured. Can it be cellulose?

Rubber manufacturers would do well to keep on the alert for new bicycle manufacturers. Brokers will naturally look after these people who will use a great deal of rubber. The latest concern to take up the bicycle-making business is the Remington Arms Co., at Ilion, N. Y.

A suit for bicycle riders that will be waterproof and allow of free movements of the limb is a thing greatly needed now. In Europe mackintosh leggings are used, split the length of the leg and fastened with loop and button. This seems to be a very crude affair, but it is said to shed mud and rain very effectually.

It is stated that a new rubber belt that has just been patented has a ribbed surface, the fluting running across the belt. These belts are claimed to be positively non-slipping and unaffected by dust and dirt. In cases where slipping is persistent a tire of the same material is placed on the pulleys, and the contact of the two fluted surfaces renders slipping an impossibility.

How to Sell Rubber Goods at a Profit.

IN a series of contributions from different dealers to *Boots and Shoes Weekly* on the theory of profits in the shoe trade several hints on handling rubber shoes appear, some of which may prove of interest to the readers of this journal, as follows:

* * *

"There is practically only one way to realize a satisfactory profit on rubber goods. Ten years retailing and two years traveling among the retail trade has proven to me that the only dealers who get a profit out of rubbers sufficient to be called a profit are those who unite and bond themselves to sell at a uniform price, especially on first qualities and seconds if you can, letting the cheaper grades take care of themselves, as there is no money in them, either for the retailer or the consumer. The only dealers throughout the country to-day who are getting a satisfactory profit out of rubbers, outside the large cities, are those who have adopted this plan."

* * *

"The trade in rubber goods has greatly changed within five years. Then all goods were sold at a profit; now, you can buy at retail, Woonsocket, Candee or Boston P. G. boots at $2.50; the dealer can easily figure this percentage of profit (?). As rapidly as possible work your trade into the use of specialties in rubbers. These will give you a good profit. On the general line the profit will be small, owing to the vast amount of cheap grades now on the market, which can be bought for sixty-five to seventy-five per cent. off the list. You must be an educator to your trade as to the actual value of rubber goods, and take time to show them (if you know) how rubber goods are made, and that the compound used in the manufacture alone determines the wearing quality of the goods."

* * *

"Regarding rubber goods, only a very small margin can be added; a first grade rubber is too costly for second or third grade trade, but I should advise that a small line of first grade rubbers be kept along with seconds and "orphans," for comparison, trying at all times to sell the better article, for this is always more profitable and satisfactory. But to get the best results regarding profits I should buy the seconds of the best grade and brand, and just add enough protective tariff on to bring them under the price of first grade goods, thus realizing a fairly good profit."

* * *

"Rubber goods, as the situation stands at the present writing, must be sold at a small profit. With care in buying, the loss on a stock of rubbers need be nothing, since they lose nothing by changing styles, and can therefore be profitably sold more closely than leather goods. Banding together and agreeing to sell at a certain price might enable dealers in any place to raise the price on rubbers; but asking more than the prevailing prices in surrounding towns would hurt them far more by giving the impression of high prices than the small advance in prices would help them. Sell the best-wearing rubbers you can find, and this may lead to the sale of goods on which you can realize a fair profit."

* * *

"The best way to get a satisfactory profit from the sale of rubbers is to sell them, and make up your mind to be satisfied with whatever profit you can get. A very satisfactory way of disposing of rubbers is to push them—of course, this means that you must call the attention of customers to the fact that you have rubbers for sale;—do not wait for them to ask for the goods, but insist upon their seeing them at any rate. The result will surely be satisfactory, if there is any satisfaction in selling rubbers."

* * *

"It is not advisable to cut prices because a competitor does it, but if you do not display some degree of tact and ingenuity the cut-price competitor will surely get the better of you. I know of no better way to meet such competition, without a sacrifice of either money or principle, than calmly and courteously to say to customers who mention your competitor, that you know your goods are worth the prices you ask, and to advise them to use discretion in the matter of choosing between the certainty of the getting good goods from you, and the possibility of getting inferior grades elsewhere."

Value of Prompt Attention to Customers.

A VERY radical fault, an insidious cause of debility in trade, is the habit of neglecting customers. The only convenience a salesman should study is that of the people who have inquiries to make or orders to place. That principle is pretty generally apprehended by shopkeepers, but not always observed by subordinates, nor, for that matter by principals. The salesman, par excellence, is a self-sacrificing man. The soldier at his post is not more steadfast to his duty and on guard against the temptations of his own personal comfort than the salesman. Hunger, weariness, indisposition, mental worry have secondary claims upon the indulgence of the subject of them. He is expected to be bright, active, prompt and patient with the man who shows any incipient buying talent. The buying disposition is so very sensitive that it will shrink up and expire if the salesman withholds any of the geniality of his sunny nature from the customer, in order to minister for a moment to his own self-indulgence. The customer, though otherwise probably a thick-skinned, obtuse man, has the most delicate feelings as a buyer, and he is hurt if through bodily ailment or other cause the salesman does not keep up a constant solicitude for him.—*Hardware (Toronto)*.

Better Than a Brick in the Boot.

TO THE EDITOR OF THE INDIA RUBBER WORLD:—In your August publication you have an article on "A Brick in the Boot," as a very good thing to dry with. I have tried the brick, but find that the small pebble stones heated in a pan are far superior and do the work faster. C. F. BECKER.

NEW YORK, November 24, 1891.

The India Rubber World Would Like to See:

A FIRST-CLASS exhibition at the coming Columbian exhibition, embracing all kinds of rubber goods.

An old-fashioned winter for the rubber-shoe trade.

More rain for the clothing trade.

James F. Brook.

An end to the evil of dating ahead.

A newspaper reporter who is not full of the idea that there is a general iron-clad rubber trust.

A factory in the United States for making cut-sheet.

A cheap light-weight substitute for litharge that could be used in colored goods as well as black.

A man who has a secret rubber compound to sell who has something really worth buying.

The machinery of the Star Rubber Co. sold in small lots, that all might have a chance at it.

A white rubber shoddy equal to a black and sold for the same price.

TRADE AND PERSONAL NOTES.

THE Woonsocket Rubber Co., after having operated their new Alice mill for more than a year, find their enterprise in constructing it fully justified. The Woonsocket company had not been regarded as a shoe company, though long engaged to some extent in making shoes. Within a little more than a year, however, they have gotten under way the largest rubber factory under one roof in the world, have trained a large contingent of new operatives, and have made, during much of the time, from 15,000 to 20,000 pairs of shoes daily. They are now making more than 20,000 pairs a day, all over new lasts and by new machinery. It is not singular that the firm feel like congratulating themselves upon such a record.

—George W. Speaight, of New York, has bestowed years of attention to the preparation of chemicals for the use of rubber-men. His factory is well adapted for the purpose, being 40 by 125 feet, and the nine years that he has been in business for himself are an assurance that he has gathered a large range of experience as to the requirements of rubber manufacturers. He devotes peculiar attention to the manufacture of bi-sulphide of carbon and chloride of sulphur. Alcannin paste, which is made abroad, however, can be obtained from him. In the chloride of sulphur he specially prepares the several grades, all of which are used more or less by rubber-men.

—The Omaha (Neb.) Rubber Co. write to THE INDIA RUBBER WORLD in relation to the fire in their store some weeks ago that their losses have been adjusted satisfactorily with the insurance company. They carried insurance amounting to $53,000, and the amount of damage by the fire has been agreed upon at $20,000. It is gratifying to learn that the company were not damaged as badly as was at first thought to be the case, and that they are "cleared up and ready for their regular hustling business."

—Theodore H. Fuller and Ralzie J. Fuller, doing business as Fuller Brothers, dealers in rubber goods at No. 148 Superior Street, Cleveland, Ohio, have made an assignment to A. F. Ingersoll for the benefit of their creditors. The firm's indebtedness was about $13,000.

—The Almy Water Tube Boiler Co., Providence, R. I., have shipped to Seattle, Washington, two boilers 120 and 200 horse-power, respectively, to be used on light-draft stern-wheel river steamers. They have under construction one 150 horse-power boiler for emergency fire pump service; one for service in running diamond-drill prospecting in mountain mining regions on the west coast of Mexico; two for heating a hospital; two for greenhouse service—the largest greenhouse in New England; one for an 80 foot yacht for a Boston man, and one for a steam-launch in Florida.

—George E. Austin, for over two years connected with the city department of the Columbia Rubber Co., has established the Imperial Rubber Co., with headquarters at No. 46 Cortlandt Street, New York. Mr. Austin is already in receipt of a large corporation trade, and is doing a fine export business. His wide acquaintance and popularity are in themselves an assurance of his success.

—The Duplex Rubber Co. have removed to No. 66 Warren Street, New York.

—Kem-Kom, advertised by the Duplex Rubber Co., for which they are agents, is a powder which is dissolved in water, and the solution sprinkled over coal intended for steam use. It is claimed for it that it will save 20 per cent. in the coal, that with it screenings and cheap grades of fuel can be used, makes steam readily, consumes largely, the smoke prevents clinkers, and is an article of value to all factory men. It is used largely in New England, and flattering testimonials have been received from consumers regarding it.

—The Empire Manufacturing Co., of Lockport, N. Y., report a very heavy demand for their rubber hose. They made recently a large shipment of elastic goods to Calcutta, India.

—The Boston Rubber Cement Co. are a new concern, located at No. 200 Devonshire Street, Boston, the headquarters of Geo. A. Alden & Co., who are financially interested in the company. Charles P. Sawyer will act as selling agent, and his former connections with other cement houses render him a valuable man for the position. The treasurer of the company is Arthur W. Stedman, who for several years was well known as salesman for Lester & Co., of Binghamton and New York. The factory is in South Natick, Mass., where ample water power enables the manufacture to be accomplished without the aid of fire, which is peculiarly dangerous in this process. G. A. Alden & Co. are among the largest importers of rubber in the country, a fact of interest in connection with this cement company.

—Chester J. Pike, the selling agent for the Wales-Goodyear Rubber Co., is selling a dainty pair of rubber boots, by mail, at 15 cents per pair, and is having quite a considerable run on them.

—The works of the Stoughton Rubber Co. are running on full time, and orders are placed so far ahead that Manager Randolph predicts a very successful season.

—The Simplex Insulated Wire Co., of Boston, have just received an order from the Edison Electric Co., Chicago, for one million feet of Simplex rubber-covered wire.

—A young man who is making many friends among the rubber-clothing manufacturers in Boston is Mr. Charles P. Smith, who has been for many years with Brainerd & Armstrong Silk Co. Mr. Smith is a young man of fine appearance and is so thoroughly conversant with the whole matter of silk thread that he is sure to meet with the best of success as a salesman.

—J. Francis Hayward, of Boston, writes that he has saved all his copies of THE INDIA RUBBER WORLD from the first number. He has had them bound into two handsome volumes, and values them exceedingly. He suggests that the publishers make a note of this, that other friends of the magazine may do likewise. By the way bound volumes may be purchased at our office.

—The Ideal Rubber Co., Brooklyn, N. Y., find their new factory on Kent Avenue a great help to them. Since moving into it they have doubled their output, and are enabled to fill orders much quicker and more to the satisfaction of themselves and customers.

—The Pure Rubber Paint Co. have opened a New England Office at No. 12 Post Office Square, Boston, under the management of Mr. W. F. Paul. The home firm are in Baltimore, Ohio, and are successors to the Tormey Rubber Paint Co. This concern has been very successful in placing a genuine rubber-paint on the market, at a price that is less per gallon than ordinary oil-paint. It is claimed by them that their goods cover twice the surface of other paints and have great durability.

—The Cable Rubber Co., Boston, have opened a store at No 28 Essex Street, having given up their former salesroom at No 150 Franklin Street. The store is on the ground floor, has an

exceedingly fine frontage, and plenty of room to carry a complete stock of rubber goods with the best advantages for displaying them.

—A prominent rubber-fabric concern in Boston has had its principal stock room for some years past over a paint store. In moving recently to another place, they find that their insurance is less than one-half, because they have neighbors whose goods are not quite as inflammable as ready-mixed paint is supposed to be; all of which goes to show that bad company is more costly in more ways than one.

—The advertisement of a rubber-paint concern recently received shows a picture of a rubber tree, out of which a stream of sap is flowing at a rate apparently of about twenty gallons a minute. This sap is caught in a pail by a kinky-haired darkey. If rubber sap would only flow as fast and copiously as this, it would have a very "bearish" effect on the rubber market.

—A Western capitalist, in a letter to New York recently, expressed a desire to assist in removing some manufacture of rubber clothing to the West, where he guarantees not only a good market, but the best of facilities for manufacture.

—Mr. Alexander Keith, No. 383 Washington Street, Boston, is making a specialty of foot-ball locks and small metal work for the rubber trade, in which he has had wide experience.

—The Harris-Corliss Engine Co., Providence, R. I., have received an order for two 500 horse-power engines, to be used in the Columbian Exhibition in 1893.

—A friend sends a recipe for devulcanizing vulcanized rubber by simply dipping it in boiling glycerine, an experiment which could be easily tried by any rubber manufacturer.

—E. M. Waldron, of the Rhode Island Coupling Co., Providence, who is so well known to the general supply trade in rubber goods and fireman's supplies, was the pioneer in this country in the manufacture of calico-printing machines, a business which he still does a great deal in.

—Mr. E. Daniel Downs, of the Gutta Percha and Rubber Manufacturing Co., has his Boston store fully equipped and is already taking orders for next year at a rate that is most satisfactory.

—The United States Rubber Co. are a new concern at No. 159 Walnut Street, Cincinnati, organized to take measures for waterproof goods and employ canvassers to sell to consumers direct. R. L. Cornelius, the manager, reports to THE INDIA RUBBER WORLD that they have connections in the leading cities.

—The New England Roller Grate Co., of Boston, Mass., whose goods have already begun to be used in rubber factories, are doing a big business with the large woolen-plants of the country, having supplied a number of mills in Maine, Vermont and Massachusetts during the last month. If the woolen-men find such practical economy in this appliance as to fit out their largest plants with it, it might pay the rubber-men to see what percentage they can save through its use.

—Mr. Williamson, formerly salesman for the Globe Rubber Works, Trenton, N. J., has been obliged to relinquish travelling on the road, and therefore has accepted a position with the New Jersey Car Spring and Rubber Co. as manager of their New York office. As he is an unusually reliable and well-known man, no doubt much of his old trade will look him up at his new stand.

—Mr. Alfred Hale, of Boston, has at his factory the patterns of a suit of diving-armor made for the distinguished civil engineer and inventor, Capt. James B. Eads, and worn by him when he was a young man in engineering matters.

—The report that Superintendent Burnham, of the Stoughton Rubber Co., was to go with another rubber clothing concern is denied, as Mr. Burnham has made arrangements to stay permanently in his present position.

—Mr. J. W. Cross, formerly of the Lowell Rubber Co., has taken charge of the Fall River (Mass.) Co.

—Mr. W. B. Covell, who was hurt in an accident on the Boston & Albany railroad not long ago, appears to be fully recovered and is again visiting his old trade.

—Mr. Thomas Himes, formerly manager of the Fall River Rubber Co., is removing to Providence, R. I., where he will have charge of the Hope Rubber Co.

—Mr. H. Reimers, of Boston, of the firm of Charles Loewenthal & Co., will soon remove from No. 45 Arch Street to No. 150 Franklin Street, taking the office formerly occupied by the Cable Rubber Co.

—The Home Rubber Co., Trenton, N. J., have secured two new salesmen for their Western trade.

—Mr. Gilmartin, former manager of the Hope Rubber Co., has opened a store in Providence, and has associated with him a partner, the firm name being Gilmartin & Fitzgerald. They will handle boots, shoes and rubber goods generally.

—Vice-President Balderston, of the National India Rubber Co., speaks of an exceedingly good trade through the West, orders by telegraph coming in to ship goods by express, which augurs a shortage in stocks that should make all rubber-shoemen happy.

—Mr. G. E. Bryant, who travels for J. Francis Hayward, is at present making a trip through Massachusetts and Connecticut, visiting his old trade, with very satisfactory results.

—Mr. C. F. Knowles, of Boston, Mass., has added a large line of electric-supplies to the rubber-goods stock he carries in his Arch Street store.

—Two proud and happy fathers of bouncing boys are Albert T. Holt, of the B. F. Goodrich Rubber Co., of Akron, Ohio, and Mr. Walter D. Walsh, of the Missouri Rubber Co., of St. Louis.

—It is said that Trenton capitalists are looking at the plant of the Star Rubber Co. with a view of purchasing it for a power plant for the new electric railroad. It is also gossipped that a prominent manufacturer of mechanical rubber goods in New Jersey will buy it if the price is satisfactory.

—The clothes-wringer combination has had a most successful year of it, declaring an 8 per cent. dividend on the common and 7 per cent. on ths preferred stock. At the same time goods are made of the best quality at a cheaper price than ever before.

—The Globe Rubber Works, of Trenton, N. J., have added another building to their plant. It is 2½ stories in height and 100×76 feet, and is to be used in hose work.

—R. D. Hall, of Boston, has accepted a position with the H. E. Swift Manufacturing Co., thus leaving the rubber business for the electric-supply business.

—Mr. George Norwood is a new salesman who is travelling in the West for the Cable Rubber Co., of Boston. Mr. Norwood has a wide acquaintance among buyers of carriage goods, and will no doubt be as successful in carriage cloth as he has been in general supplies.

—Mr. Crisp, one of the best known and most reliable salesmen in the line of mechanical-rubber goods, has accepted a position with the Whitehead Brothers Rubber Co., of Trenton, N. J.

—William Morse, who has been appointed manager of the New York office of the American Rubber Co., was eight years manager of the rubber department of Morse & Rogers, New York, and is very favorably known to the trade. Particular prominence will be given to the clothing department, a branch of the business in which the company have every facility for excellence. Mr. Wallace's services will still be retained by the company.

—The Columbian Rubber Co. report a prosperous year, and believe that the succeeding one will be on still better lines.

—The City of Chicago has awarded to the Eureka Fire Hose Co. a contract for 8000 feet of hose for the Fire Department of that city. This is a handsome order and speaks well for the quality of goods furnished by the Eureka people.

—A canvass of rubber boot-and-shoe men discloses one prominent fact, that each and every one of them is crowded with orders which they cannot begin to fill. To mention names would be to enumerate them all. They say it is getting to be a great winter out West. All hands are wondering when they will have a chance to think of tennis goods, as a great business in them is expected next season.

—The National India Rubber Co. are selling so much seamless insulated wire, protected by wire and braid, that they intend to enlarge their plant to four times the present capacity.

—The Newton Rubber Co. are giving special attention to the manufacture of storage-battery cells and all-rubber goods for electrical use. They have excellent facilities for this purpose.

—Rubber cushions are now applied to the buckets of turbine water-wheels to prevent the depression of the jet into spray which serves to a greater or less extent upon its striking or metallic surface. The efficiency, it is said, is increased to 30 per cent. by this method.

—The Atlas Rubber Co. are in receipt of some very fine orders from Spain for their specialties. One export order each day is the rule now with this company.

—Rubber wheels have the advantage of being noiseless, but are often so imperfectly made as to be objectionable. The rubber is commonly sprung into a groove, but if the wheel do not run true, it springs out almost as readily. If vulcanized on, the motion of the wheel will loosen the rubber. A new wheel has come into use. An annular rim of rubber is mounted on the shoulders of two compressing metallic disks, and firmly compressed between the two flanges by screws. By this method the rubber cannot slip off, but when worn out it can be removed by taking the wheel apart.

—Captain Sharretts, of the United States General Appraisers' office, in New York, has decided in the case of some India-rubber dolls, imported by George Borgfeldt & Co., that they were dutiable at the higher rate, 35 per cent. There seems to be some confusion in the law, in one section providing that all manufactures of India-rubber, of which that substance is the component material of chief value, not specially provided for, shall be dutiable at 30 per cent. Toys composed of rubber, excepting dolls, are excluded from this classification by another provision. The goods were invoiced as toys, and in the contest the appellant failed to appear or to present samples of the goods in contest. It is claimed by the Custom House authorities that the more specific intention of the law is to classify them as dolls, without regard to the material of which they are composed, and the duty of 35 per cent. is confirmed.

—The Metropolitan Rubber Co., New York, expect to remove about January 15 to No. 676 Broadway. The New York Insulated Wire Co., who have occupied the same store with the Metropolitan people, have taken new quarters on Cortlandt Street.

—The Peerless Rubber Co., New York, are having a great run on hose for steam-heating purposes on railways, finding it difficult to supply all orders. All railways obtaining new freight equipment place the air-brake upon it and its use is becoming well-nigh universal. The Southern Pacific Railway refuses to receive cars in transit over its lines unless they are so equipped, and now as all roads are more or less in the market for new cars and plenty of them, those rubber companies who are fortunate enough to be in line for the railway business will probably have their hands full in supplying hose for months to come. Railroads order cars by the thousand, and the business of supplying them with hose is desirable.

—F. F. Foster, of the Rubber Specialty Manufacturing Co., New York, has returned from an extended trip throughout the West. He reports a large sale of his eider-down and flannel pouches, in which hot-water bottles are incased. Small bottles made up in this manner can be applied to the face or the body, and their use is not at all objectionable, as might be the case with some styles of bottles. There is also a good demand reported for the Champion expander made by this company.

—The Hodgman Rubber Co., New York, have added to their stock of fine mackintoshes a new garment which is most stylish and serviceable. It is lined throughout with silk, and is made of imported cloth coated at the factory of the company. It is for ladies' wear and is peculiarly noticeable for the style of cut.

—The wedding of Captain H. E. Converse and Miss Mary C. Parker took place on December 2, at 8 P. M., and was a very brilliant affair. It was solemnized in the Baptist church at Malden, Mass., and was attended by 1800 persons, it is estimated. This is the church for the building of which the Hon. E. S. Converse, father of the bridegroom, contributed $50,000. A reception at the house of Mr. Converse followed, and on their return from a wedding journey the young couple will reside there.

—Col. William W. Clapp, father of George D. Clapp, of the Pará Rubber Shoe Co., died very suddenly in Boston, December 8, of acute bronchitis. He was sick but an hour. He was sixty-five years of age, and was for many years, and until very recently, editor of the Boston *Journal*.

—Mr. H. H. Tyer, president of the Tyer Rubber Co., Andover, Mass., is spending a month at the Battery Park Hotel, Asheville, N. C. Mr. Tyer has his family with him, and no doubt will enjoy his vacation at this beautiful and fashionable winter resort.

—The Hon. E. S. Converse, of the Boston Rubber Shoe Co. has just returned from the famous resort at Lakewood, N. J. Few New Englanders appreciate what magnificent hotels and what a delightful climate is to be found among the pines of New Jersey. Wealthy New Yorkers, however, know all about it, and many of them think Lakewood the most delightful spot on earth.

—John Hopewell, Jr., President of the Reading Rubber Manufacturing Co., Boston, Mass., was one of the successful candidates for election to the Massachusetts House of Representatives recently.

—G. Lewis Richards, of the Boston Rubber Shoe Co., has been elected to the common council in the city of Malden, Mass., for the second year.

—The Home Rubber Co., of Trenton, N. J., are going to purchase two more tubing machines, and two presses for mold work. Now is the time for some enterprising machine man to jump in and get this order, before his competitors are awake.

—A. D. Hawkins, Herbert Bill, Charles Bishop, Frank Place and Miss Olcott will terminate their engagements with the Metropolitan Rubber Co., New York, at the end of the present month.

—A fine line of black enameled cloth is being put on the market by the Western Linoleum Co., of Akron, Ohio. The superintendent of this concern, Mr. Charles Templeton, was a former superintendent of the great Philadelphia house of Thomas Potter, Sons & Co., and is accounted one of the most skillful men in his line in the country. Although a young man he has invented many processes and designs that have been very successful.

Review of the Rubber Market.

THE rubber market of the past thirty days has been quiet and steady, ranging between 63 and 68 cents for fine Pará. Manufacturers seem inclined to buy freely at these figures, and they will, it is thought, be in the market for extensive purchases, should prices reach what is now considered the extreme quotation of 60 cents. Manufacturers' stocks are fair but not excessive, and as Brazilian affairs are not so intense as they were, the market is considered to be in a normal condition with transactions substantially on a basis of supply and demand. There have been no large transactions, and in first hands stocks are moderate.

Centrals are very scarce, the floating stock having been bought up closely for consumption. Africans of the better grades have been in good demand at slightly lower prices. Assams are scarce for the moment.

The arrivals at New York during the past thirty days have been as follows:

	Fine.	Caucho.
November 24—By the *Clement*....	548,000 pounds.	3,000 pounds.
November 27—By the *Vigilanza*..	203,000 pounds.	90,000 pounds.
December 3—By the *Origen*....	415,000 pounds.	42,000 pounds.
December 7—By the *Paraense*.	763,000 pounds.	65,000 pounds.
Total.....	2,129,000 pounds.	200,000 pounds.

On passage there are the steamer *Basil* with 440 tons; the *Advance* with 100 tons, and the *Finance* with 120 tons. For Europe there are afloat 460 tons.

The statistical position of Pará rubber in New York is thus reported for November, 1891, as compared with the same month in preceding years:

Statistics of Pará Rubber.

Stock of Para here October 31,		about	1,300,000 pounds.
Receipts " " November		"	1,948,000 pounds.
Deliveries " " "		"	2,123,000 pounds.
Stock " " November 30,	1891,	"	1,125,000 pounds.
" " " November "	1890,	"	1,100,000 pounds.
" " " " "	1889,	"	700,000 pounds.

Prices for November.

	1891.		1890.		1889.	
	Fine.	Coarse.	Fine.	Coarse.	Fine.	Coarse.
First.....	63	46	74	53	72	50
Highest...	68	51	74	53	73	55
Lowest...	63	46	72	49	71	50
Last.....	65	48	72	50	73	55

The latest New York quotations are:

Para, fine, new.....	63-64	Tongues.....	38-39
Para, fine, old.....	68-70	Sierra Leone.....	28-44
Para, coarse, new.....	47-48	Benguela.....	48-49
Para, coarse, old.....	49-50	Congo Ball.....	——
Caucho (Peruvian) strip.....	45-46	Small Ball.....	——
Caucho (Peruvian) ball.....	52-53	Flake, Lump and Ord.....	25-27
Mangabeira, sheet.....	37-38	Mozambique, red ball.....	
Esmeralda, sausage.....	49-57	Mozambique, white ball.....	
Guayaquil, strip.....	38-40	Madagascar, pinky.....	51-52
Virgin Scrap.....	——	Madagascar, black.....	35-42
Carthagena, strip.....	——	Borneo.....	30-43
Nicaragua, scrap.....	46-48	Gutta percha, fine grade....	140@150
Nicaragua, sheet.....	44-46	Gutta percha, medium.....	100
Guatemala, sheet.....	40-45	Gutta percha, hard white..	100
Thimbles.....	42-44	Gutta percha, lower sorts..	60-83

Mail advices from Liverpool report the sales of Pará during November at 645 tons and arrivals at 645 tons, with a net stock at the end of the month of 445 tons against 706 tons at the same time in 1890 and 343 tons in 1889. Prices had moved within a narrow range during the month, the extreme of fluctuations being about 4 cents, Ceará had sold as high as 1s. 9d. and down to 11d.; Mangabeira, 1s. 5½d. @ 1s. 6d.; Peruvian slabs and strips 1s. 9d. @ 1s. 10d. Africans had been in good demand. The stock at the end of the month was 575 tons with quotations as follows:

Gambia.....	1s. 2d.	@	2s. 3d.
Sierra Leone Nigers.....	11¼d.	@	1s. 9d.
Thimbles.....	1s. 8½d.	@	1s. 9d.
Acera.....	1s. 0d.	@	1s. 10d.
Congo Ball.....	1s. 7d.	@	1s. 8d.
Tongues.....	1s. 3d.	@	1s. 6d.
Salt Pond.....	1s. 0½d.	@	1s. 8d.
Liberian.....	1s. 0d.	@	1s. 3d.

Late cables from London give a quotation of 2s. 9½d. for fine Pará.

Cables from Pará give prices for Islands at 4100 milreis. Upriver 4400 milreis and coarse at 3,250 milreis with exchange at 12½d. Notwithstanding previous reports political matters in Pará have been during the Brazilian revolution in a quiet state. Should they in the immediate future be otherwise, it is thought that prices there would decline, but the tendency might, however, be upward in New York.

The visible supply of Pará rubber on December 1, with comparisons for November 1, is estimated as follows:

	December 1, 1891.	November 1, 1891.
United States.....	491 tons.	617 tons.
England.....	525 tons.	550 tons.
Pará.....	1010 tons.	210 tons.
Afloat to United States.....	700 tons.	790 tons.
Afloat to England.....	325 tons.	495 tons.
Total	3051 tons.	2662 tons.

The visible supply on December 1, 1890, consisted of 3000 tons.

The receipts at Pará so far this month approximate 650 tons and the estimates for the month are 2500 tons.

Simpson and Beers, brokers, of New York, make the following report of the market for India-rubber paper: "During the past month we have had a comfortably easy money market, and in general there has been a good demand for paper. Rubber paper, especially, is scarce. Sales have been mostly at 6 and 6½ per cent. for 3 to 4 months paper. The prospect is for abundant money from now until April next. Rubber manufacturers will not be borrowers to any great extent for two or three months, as their collections will be liberal and what prime paper may be made will be readily sold at 6 per cent."

Manufactured goods there has been a very fair demand, boot and shoe men have been very unusually busy, and on some of the heavy grades orders cannot be filled. The weather West has turned very seasonable, and in consequence retailers are rapidly moving off stocks which heretofore were almost stagnant, and a cheerful feeling pervades every step in the trade from manufacturer to consumer. In New York and its vicinity, however, the retail trade is very dull, very few indeed of the heavier goods having passed into consumption. Stocks of all descriptions are light.

In clothing the city demand has not been good, and only fair outside. The weather in this vicinity has been against the trade so far all the season, and generally there is no disposition to extend lines.

In mechanical goods it is the dull season, and there is little of interest to relate. Some heavy contracts for fire hose have been placed. Manufacturers are now turning their attention to "three-quarter" hose and to the demands for the next season which will soon be due. To this end mills are running full time, and to full capacity, which augurs that next season will be a good one.

In Christmas goods, such as atomizers and toilet articles, there has been an excellent season, and the lines of goods adapted to this particular trade absorb more interest from year to year. In druggists' sundries there is a good business. Webbing is dull and but little is expected from this line for the present. The price of rubber thread has been reduced.

Boiler Explosion Caused by Rubber.

A BOILER explosion recently occurred from a curious cause. Steam was taken from the side of the dome. In connecting the steam pipe to the dome, the engineer used a stout rubber gasket, which he trimmed neatly around the outside of the flange. He forgot, however, to cut a hole through it for the steam to pass through. If the full boiler pressure had acted on the blind gasket, it would probably have bulged out, forcing a way out for itself; but under the circumstances the effective pressure on the gasket, was only the difference between the pressure in this boiler and that in the others. Even then, it hardly seems as though the rubber would be strong enough to allow the pressure to run up to the bursting point, but it was strong enough, for it was afterwards found unbroken; and the boiler blew up and did over $1000 worth of damage.—*Mechanics (London)*.

Sixtieth Birthday of a Rubber-Man.

THE regular routine duties of the B. F. Goodrich Co.'s office force at Akron, Ohio, were interrupted on the afternoon of November 17, at 3 o'clock, by a pleasant surprise tendered Francis H. Holton, superintendent of the specialty department. It was the occasion of Mr. Holton's sixtieth birthday and his friends in the office and the employés in his department took it as a proper time to display their appreciation and esteem for him. By arrangement Mr. Holton about 3 o'clock was called from his office. In his absence his friends assembled. The surprise on his return was a complete one, as he stepped into his office and found himself surrounded. H. C. Corson, treasurer of the B. F. Goodrich Co., in appropriate remarks presented Mr. Holton with an elegant clock in marble and bronze, a representation of a Grecian temple. The clock is a model of artistic skill and is not duplicated in Akron. Mr. Holton feelingly replied in terms of appreciation for the kindness of which he was the recipient.

USES OF RUBBER IN MINING AND METALLURGY.

By Albert Williams, Jr., Mining Engineer.

AT first glance mining looks like pretty rough work; but it requires little reflection and study of the conditions to recognize the fact that a high degree of excellence is called for in the machinery and appliances used in prosecuting it. Economy in first cost is not often the main consideration in selecting material; durability and efficient service during the life of any particular piece of apparatus are far more important to the miner than any temporary paring down in cost of plant. For example, it would be no argument in favor of a rubber belt for mine or mill work to say that it can be bought for a third less money than an equivalent leather one; but if the intending purchaser is made to understand that the rubber belt will serve his purpose better, cause less stoppage for adjustment and last longer under the peculiar conditions to which it is to be subjected, that is a different proposition and one that usually will determine the choice altogether irrespective of relative cheapness.

Most mines and metallurgical works are situated at some distance from points of supply, many of them inconveniently far and subject to excessive freight charges and to interruptions of transportation from snow blockades, etc. It is customary to carry certain parts of their appliances in duplicate; but as it would be inconvenient and economically impracticable to have complete sets of duplicates, it becomes imperative that there should be most careful selection of all material. Delays in mining or ore-treatment are more harmful than in most other industries, as they generally lead to large indirect losses, since a stoppage in one branch of the process is apt to bring the whole enterprise to a halt until remedied. Thus a shutting-down of a concentrating-mill from the failure of an elevator-belt which could not be replaced without a long delay, would be a far more serious matter than a corresponding break-down in a factory located almost alongside the machinery dealers or manufacturers.

There are peculiarly trying conditions to be provided against in most mining-regions, demanding certain resisting qualities in materials apart from mere strength. In the Far West the climate is subject to extremes of heat and cold, and in the thin air of the mountains the daily change in temperature is often as great as that due to the seasons in other places. This calls for especial care in the manufacture of all goods intended for mining use, and because that care was not exercised formerly and also because the methods of preparation were inferior, a prejudice arose among miners against the use of rubber in all forms. They believed, and the feeling is not altogether eradicated yet in spite of practical demonstration to the contrary, that large temperature changes would seriously affect all rubber. In point of fact there has been no trouble whatever on this score for many years, but, as first stated, a prejudice still exists among the uninformed that can only be overcome by pointing to records of service. The atmosphere is generally dry in our mining areas, and in the Southwest it is excessively so. This is really more trying than temperature to rubber, though not popularly so considered; but fortunately modern modes of manufacture satisfactorily provide against it. But though the air as a whole is so extremely dry, that about the mining and metallurgical works is liable to irregular degrees of alternating moisture. However, the very difficulty of meeting the trying conditions bars out competing materials, and for many special purposes leaves an entirely clear field for rubber. Leather and unprotected canvas would not stand the trials to which rubber is put. Then there is a great deal of dust, often strongly alkaline, floating in the air; and in dry-crushing stamp mills that caused by the stamps. The mine-waters are often strongly impregnated with sulphates of iron and copper and occasionally contain sulphuretted hydrogen. In the reduction-works there is much exposure to fumes from roasting or smelting (consisting in part of sulphurous-acid gas and chlorine) and in some processes strongly acid solutions are used.

From this general outline of the conditions to be faced, manufacturers will see at once that not only the articles prepared for resisting a particular source of deterioration, but all rubber goods whatever, intended for use about the mines and reduction works, ought to be of good all-around grade, for it is impossible to foresee in advance just what kind of exposure is likely to occur, and users are not as a rule familiar with the action of physical or chemical conditions.

This general statement indicates that manufacturers who make a specialty of supplying the mining-trade have an intricate problem before them. At present there are three important concerns supplying rubber in large quantity for mining use, though for small sundries used about the mines as well as in the general trade there is a long list of manufacturers. We now come to the more specific uses of rubber in mining, of which space permits only a partial list here.

Although hydraulic placer-mining was done originally by means of rubber hose—and indeed this method of mining was accidentally so discovered—comparatively little rubber is now so absorbed. The rubber hose made for the purpose, one to two-and-a-half inches in diameter, is not large enough for efficient work. Regular rubber-and-cotton fire-hose is in too short lengths and too expensive, and there is no necessity for quick coupling. For hydraulic mining on the large scale, where heads of 300 to 600 feet with a delivery of a thousand inches of water (1 miner's inch=750 gallons per hour) are employed there is no opening for rubber. For this purpose the strongest sheet-iron riveted pipes are necessary to resist the enormous pressure But a limited field still exists in which rubber hose is ap-

plicable, and which ought to be occupied by our manufacturers; and that is in supplying for small hydraulic mines a strong-enough hose to stand from 100 to 300 feet pressure with an inside diameter up to four inches, covered or armored to resist the abrasion over rough rocks and frequent dragging about, made in extra-long lengths. It must be remembered that the usage in mining would be far rougher than with fire-hose, and that there would be no ready means of repairing and splicing.

In the hoisting-works of a mine there is comparatively little belting. The cable-reels are driven direct or by gearing, and the heavy Cornish pumps are always geared. Where dynamos are used they can be belted on from a counter-shaft—steam-pumps underground are sometimes fed by steam-hose from the boilers at the surface. All the valves and packings of mining-pumps must be of the very best material and adjustment; they and the suction-hose have to handle mine-water often strongly mineralized and with much mud and grit. The failure of a single clack in a Cornish jack-head (which is often called upon to work for hours under water in drowned-out mines) might cause a delay entailing a loss of many thousands of dollars, since it might be impossible to get at it for replacing. Reliability in all its parts is the first essential of a mine-pump.

The power-drills call for a great deal of feed-pipe. In mining, if electric drills are not used, the drills are run by compressed air, which serves the very important additional service of ventilation and cooling from the exhaust. Quarries use either compressed air or steam—more commonly the latter. The air-drill pipes in mines and tunnels may be from 1000 feet to many thousands of feet in length. The initial pressure at the compressor is usually 60 to 80 pounds, but is much less at the delivery, owing to loss from friction and numerous bends. The rubber hose made for this purpose is entirely satisfactory and has no competitor.

Ventilating-pipes in mines are of large diameter and take air from the fans and blowers at quite low pressure. Wooden boxes and sheet-iron and tinned-iron pipes are commonly used. Where there are air-drills the blower-pipes are not needed for ventilation as a rule. A rubber-and-cotton ventilating-hose, not especially strong as against pressure (say two- to four-ply) but rather stiff, so as to preserve its form around bends, and protected against abrasion, ought to be a salable article, if made especially for the purpose.

About the hoisting and mill machinery there is room for the ordinary rubber steam-fittings, packing, jacketing, gaskets, piston-rings, valves, washers, springs, etc., which call for no special mention here. There is also usually considerable common feed- and fire-hose.

If the plant is run by electrical power or has subsidiary electrical appliances there is the usual necessity for insulators and rubber or vulcanite fittings, which ought to be especially good, as they are likely to be entrusted to inexperienced hands.

Metallurgical works require very large supplies of rubber. For many purposes there is no substitute whatever, while in others rubber stands so far ahead of rival substances as to leave little room for competition. Manufacturers should study closely the requirements of these establishments, for they offer a most promising field.

All kinds of reduction-works require a good deal of belting. The climatic conditions and the alternations of dryness and moisture have been already indicated. Most of the best new reduction and concentration mills are furnished with rubber belting throughout. The seamless style is a favorite, as it runs equally well either next to or outside the pulley. The belts often cross, and a good many machines are started by tighteners taking the reverse side of the belt. Wooden pulleys are not often used except on account of cheapness or where improvised on the spot, and are not popular. In dry-crushing stamp-mills the rubber driving-belts are moistened with a thin brushing of boiled linseed oil, and sometimes with a mixture of that and plumbago, etc. But there is seldom any trouble from shipping if the rubber belts are adjusted properly when first put on. The main driving-belts would be better if endless and made to order. Such belts are not exceptionally large, eighteen to twenty inches being about the widest used, but they are made heavy. A main driving-belt just supplied to a mill at Kokomo, Colorado, is an example of what is considered a fairly heavy belt; it is 150 feet by 10 inches and eight-ply seamless.

In concentrating-mills the driving-belts are subject to much dripping of water and for some parts of the machinery the belts run down through water. Besides the driving-belts there are elevator-belts fitted with iron or steel buckets, which convey concentrates or other material in the shape of a thin mud or a gritty pulp. Rubber is the only material fit for these elevators, except the iron-linked elevators which, however, are rarely used and are less flexible and more cumbrous and inconvenient. In mills of this class not connected with other metallurgical plant there are no fumes, furnace gases or chemical solutions to be encountered. The conditions are alternating moisture and dryness, or continuous soaking.

There is a class of machines called belt vanners, used in concentrating, of which the Frue, Embrey, etc., are types, in which an endless-belt having a transverse or an end shake travels up against a stream of "pulps" (wet crushed ore) and water, and delivers the concentrates over the head into a receiver into which the belt dips. These belts are of rubber, usually smooth, but in a new form corrugated, with an edge flange. They are made very carefully, and though expensive are very satisfactory, as the material is not only durable under the conditions, but furnishes just the right surface texture for concentrating—a most essential point.

A great deal of sheet rubber is used for repairs and small fittings about these mills, and a moderate amount of rubber cement. Common rubber hose is also employed in large quantity.

Gold-quartz mills of the common type use rubber under the same conditions as concentrating mills—moisture and dryness, heat and cold, but no chemicals or fumes. Amalgamating-mills in which the ore is roasted before amalgamation give off free chlorine and sulphurous-acid gases. Wet-crushing silver-mills use common salt, sulphate

of copper and sometimes cyanide of potash in solution, which may pass subsequently through a concentration-plant below. Dry-crushing silver-mills and lixiviation-works have roasting-furnaces, which evolve acid fumes. The roasted ore contains chlorides, sulphides, sulphates, arsenides, arseniates, antimonides, and antimoniates, etc., of iron, copper, zinc and lead; and in leaching, hyposulphites of soda and lime, polysulphides, iron sulphate and various other chemicals are used, in comparatively weak solutions. In some processes the solutions are employed hot; more commonly they are cold. Quicksilver of course is used in amalgamation, but is handled in iron flasks and is drawn off in pipes.

In a leaching-plant there is very little moving machinery except the pumps, but as almost everything handled is impregnated with the minerals in the ore or produced in roasting it, or with the chemicals added for leaching or precipitating, and as large volumes of standard solutions, plain water, graduated solutions and precipitants are to be handled, there is necessarily a great deal of fixed piping and movable hose. All this must be acid-proof and prepared with a precise knowledge of the chemicals it is to come in contact with. Rubber, properly made, is the best material.

There is great trouble in keeping the leaching and precipitating vats and the launders water-tight. The vats are round (never square), and the staves are of very heavy plank fitted most carefully. Yet they will leak, in spite of all sorts of "dopes" of asphalt and other preparations. Metallic paints like white lead are out of the question for inside surfaces, on account of possible chemical reactions with the solutions to be held. Here would seem to be an opportunity for the introduction of a special rubber varnish or cement, acid-proof, tough and flexible so as to give with the shrinkage of the wood in drying, and resisting abrasion from the pulp. If such a surfacing could be produced there would be a market for considerable quantities of it; and it need not be a very cheap material, either.

The assay offices use a good deal of small rubber tubing, rubber stopples, etc., and the testing laboratories also take miscellaneous small rubber supplies.

In smelting-works there is considerable belting, for driving blowers, dynamos and other machinery. Here there is considerable exposure to fumous gases (mainly sulphurous) and in places to an unavoidable degree of heat which would harden and rapidly destroy inferior rubber goods. The smelters usually have in addition to the furnace plant a secondary wet process or processes of some kind, which require an equipment similar to that of the chlorinating-leaching works just alluded to.

In the mining-regions there is a large demand for miscellaneous rubber sundries, such as boots, coats, blankets and other small goods of the regular trade.

It is impossible in the limit of a single article to enter into much detail in either of the many branches of consumption which mining and metallurgy offer to rubber. In a few of these lines enterprising manufacturers are endeavoring to meet the requirements and are succeeding admirably. But as the manufacturers do not themselves deal directly with the purchasers and users, it becomes all the more necessary to make a special study in each case and ascertain just what the customer wants. They should invite specifications from mining-men and metallurgical engineers; then, with a definite understanding of any given problem it would be a straightforward task to solve it. The investigation of any particular case would also be very likely to disclose analogous uses to which rubber is adapted and thus open up new directions for consumption.

The best markets for all kinds of mining-machinery and supplies (including rubber goods) are not the large, settled and well-known districts, but those in process of development. In the former almost all the equipment has already been provided, and there are only the replacements and small additions to be looked out for. But in a newly-opened district, where extensive plants are projected and everything has to be supplied from the ground up, there is room for a large business. Then, too, in new camps the men who direct operations and select the plant are apt to be more progressive, more ready to take hold of what is latest and best, and are less hampered by traditions of obsolete appliances and discarded materials. Just now the best fields to canvass are the new camps in Montana, Idaho, the San Juan country of Colorado, the Southwest territories of New Mexico and Arizona, and those parts of Mexico, Central America and South America where American capital is going into mining enterprises, or where American superintendents are managing the operations of foreign corporations. In introducing goods into Australia, South Africa or India a reference to successful service in American mining is the strongest recommendation, since the standard of progress is now acknowledged to be set by our engineers.

HOW MECHANICAL RUBBER GOODS ARE MADE.

WHILE the manufacture of rubber goods is in no sense a secret industry, the majority of buyers and users of such goods have never stepped inside of a rubber-mill, and many have very crude ideas as to how the goods are made up. In ordinary garden-hose, for instance, the process is as follows: The inner tubing is made of a strip of rubber fifty feet in length, which is laid on a long zinc-covered table and its edges drawn together over a hose-pole. The cover, which is of what is called "friction," that is cloth with rubber forced through its meshes, comes to the hose-maker in strips, cut on the bias, which are wound around the outside of the tube and adhere tightly to it. The hose-pole is then put in something like a fifty-foot lathe and, while the pole revolves slowly, it is tightly wrapped with strips of cloth, in order that it may not get out of shape while undergoing the

process of vulcanizing. When a number of these hose-poles have been covered in this way they are laid in a pan set on trucks and are then run into a long boiler, shut in, and live steam is turned on. When the goods are cured steam is blown off, the vulcanizer opened and the cloths are removed. The hose is then slipped off the pole by forcing air from a compressor between the rubber and the hose-pole. This, of course, is what is known as hose that has a seam in it.

For seamless hose the tube is made in a tubing machine and slipped upon the hose-pole by reversing the process that is used in removing hose by air compression. In other words, a knot is tied in one end of the fifty-foot tube and the other end is placed against the hose-pole and being carefully inflated with air it is slipped on without the least trouble. For various kinds of hose the processes vary, and there are machines for winding with wire and intricate processes for the heavy grades of suction-hose, etc. For steam-hose, brewers' and acid-hose, special resisting compounds are used, that as a rule are the secrets of the various manufacturers. Cotton hose is woven through machines expressly designed for that purpose, and afterwards has a half-cured rubber tube drawn through it. One end is then securely stopped up and the other end forced on a cone through which steam is introduced to the inside of the hose, forcing the rubber against the cotton cover, finishing the cure and fixing it firmly in its place.

CORRUGATED MATTING.

After the mixing of the compound and the calendering, that is the spreading it in sheets, the great roll of rubber and cloth that is to be made into corrugated matting is sent to the press-man. Here it is hung in a rack and fifteen or twenty feet of it drawn between the plates of the huge hydraulic steam press. The bottom plate of this press is grooved its whole length, so that when the upper platen is let down the plain sheet of rubber is forced into the grooves and the corrugations are formed. While in that position steam is let into the upper and lower platens and the matting is cured. After it has been in there the proper time, cold water is let into the press, it is cooled off, and the upper platen being raised, it is ready to come out. A simple device for loosening the matting from the grooves into which it has been forced is a long steel rod, with a handle on one end like an auger-handle, which being introduced under the edge and twisted allows the air to enter with it and releases it from the mold.

PACKING.

Sheet packing is oftentimes made in a press like corrugated matting. The varieties, however, known as gum-core have to go through a different process. Usually a core is squirted through a tube machine and the outside covering of jute or cotton or whatever the fabric may be, is put on by a braider or is wrapped about it somewhat after the manner of the old-fashioned cloth-wrapped tubing. The fabric is either treated with some heat resisting mixture or something that is a lubricant, plumbago and oil being the compound. Other packings are made from the ends of belts cut out in a circular form and treated with a lubricant. There are scores of styles that make special claims for excellences that are made in a variety of ways, but as a rule the general system as outlined above is followed.

JAR-RINGS.

The old-fashioned way of making jar-rings was, first to take a large mandrel and wrap it around with a sheet of compounded rubber until the thickness of the ring was secured. It was then held in place by a further wrapping of cloth, vulcanized, put in a lathe and cut up into rings by hand. That manner of procedure, however, was too slow and it is to-day done almost wholly by machinery. For example, the rubber is squirted out of a mammoth tubing-machine in the shape of a huge tube, then slipped on a mandrel and vulcanized. It is then put in an automatic lathe and revolving swiftly is brought against a sharp knife blade which cuts ring after ring until the whole is consumed without any handling or watching.

WHY SOME PACKING DOES NOT PACK.

By Robert Grimshaw, Mechanical Engineer.

I HAVE been asked to give some reasons why ordinary packing does not always pack and to make some criticism of packings now in the market. While I cannot cover the whole subject in one article, I can at least state some reasons why some packings do not pack, and may follow them up with reasons why under some circumstances no packing can or ever will pack. One of the first reasons is that there are three classes of people who conspire to render the production of a good packing, and its proper use, difficult and in some cases impossible.

The first of these classes of people build steam-engines with the stuffing-boxes badly designed and badly constructed. In common with the members of the other two classes, they have an idea that packing is a jamming or a tamping instead of a mere elastic device for keeping steam from passing through an annular orifice.

In order to make an engine that will pack well, there must be considerable depth of stuffing-box, and the gland must not be so deep, proportionately, as to fill it up and make it impossible to put more than about two coils of packing into it. A box that is long enough to take in six turns of packing will be better, everything being equal, than one which will only receive four; it will put less strain upon any one coil and the rod and packing will last longer. Not one engine in three on the market has a deep

enough stuffing-box and proportionately short enough gland. The Straight-Line Engine Co. get along for quite a while without any packing at all, because they have about four rod diameters in length in their box, and that is bushed with Babbitt metal, leaving an annular orifice of very slight thickness so long that the steam cannot find its way out before the back-stroke is completed and the pressure removed. If other engine-builders would take a hint from this, the packing-makers would have a better show and the engine-buyers would have fewer scored rods, or less waste of steam from leakage.

For the same reasons that call for deeper stuffing-boxes most of those that we see are of too slight diameter, leaving no chance to get in rings of sufficient size. With from 50 to 100 per cent. greater space between rod and stuffing-box wall, rings could be used which by gentle pressure would be perfectly elastic and would make steam-tight joints without absorbing undue power in friction, and without undue wear of packing and rod. With deeper stuffing-boxes and greater packing space, engineers could do packing instead of jamming; and the results would be better all around.

A further error in some engine-builders is the use of glands that are driven in by two bolts, one each side of the rod. Of course this is a lighter and cheaper construction than the screw principle, but at the same time it often results in the gland being cocked and the rod worn too much on the sides, while there may be blowing on the other two quarters of the rod's circumference. The screw gland is much easier than the flange-and-bolt type. Any one who doubts this has only to know what the experienced locomotive-engineer does in case of an accident requiring him to place and hold his slide valve at mid-travel. He places it so that it does not blow at either end, and then if the valve rod is not broken off inside the chest, or the yoke is not broken, he gets a few extra turns of the bolt on one side, thus cocking the gland and jamming that stem so that neither it nor the valve attached to it can have any motion. If that stem were to slip, there might be a great smash-up. Any engineer can stop almost any engine with this type of gland, by merely tightening up on one of the bolts. In fact he can without much trouble do the same thing with many of the screw type, too—which should give him a lesson on the difference between packing and jamming.

Having paid my respects to engine-builders and shown them where they fail in their duty to packing-makers and to engine-buyers and engine-runners, I may now further say that one reason why packing does not pack is that unscrupulous manufacturers use too poor materials; and this is more so the case with India-rubber packing than with any other kind. The ability to use poor stuff and little of it, as against pure stuff and plenty of it, is too great; and the facility of detection on the part of the buyers, too slight. Against these things the buyer has very little protection except the reputation of the house—unless he wants to find out all about every kind of packing in the market on the plan that the Irishman selected to prove that a crow would live a hundred years. (He bought one to try.)

Next we come to the engine-owner or supply-purchaser. Much of the packing in the market doesn't pack because the purchasing-agent wants to get gold dollars for fifty-cent "shin-plasters," and as the history of the world runs, there are few instances where such deals are made, resulting in any high degree of satisfaction to the purchaser for any great length of time. People who want to get packing too cheap will get cheap packing, and perhaps they will feel cheap if the results are brought home to them, but they very seldom are as they should be.

Now for the engine-runner—whom people miscall the engineer, but who should be just as desirous of having his title distinctive as is he of any other occupation. One of the most common reasons why packing does not pack is that the engineer orders, or accepts without protest, packing that is of the wrong size, usually of too great diameter, either from ignorance, or to save himself trouble in cutting and applying it. I would rather have two coils of three-quarter inch packing in a box, than one coil of one and one-half inch—at least at most times. Of course there are some kinds that are made with different edges and they should be used of the size recommended by their makers, who are best interested in their lasting. But where packing is the same on both edges, it is better to have two coils between the rod and the stuffing-box wall than only one.

Another reason why packing does not pack is that it is wrongly cut; the ends are not properly mitered and there is either a space through which steam can blow, or a lump and a kink, which jams the rod in one place and perhaps lets steam blow right by it also. If the engineer would try the shape of some of the rings that he cuts, by coiling them around a mandrel or a short wooden cylinder, he would discover that a plain 45-degree or other miter, the same on both ends of the straightened-out piece of packing, is not going to make a proper lap when that same piece is deformed by being coiled around a rod.

After getting the packing cut, whether rightly or wrongly, the engineer very often sets the coil down on a gritty surface, as the engine-room floor, before it goes into the stuffing-box; and then every little piece of grit, particularly if it be cinder, scores the rod nicely just as though the maker of the packing had put it there to order for that very purpose. Sometimes the engine-runner will cut his packing on the engine-room floor, or on the door-step, and pick up quite a small cargo of grit—and it takes only a very small grain of sand to do considerable scoring. Then the maker of the packing is blamed, or worse.

After getting the packing in, whether it is cut right or not, and whether or not it has grit on it, there is a chance of injustice being done it and its maker by its being set up too hard. For every case where a box is too loosely packed, there are about three that are set up too hard, with the three-fold bad effect of consuming power, scoring the rod, and wearing out the packing too fast. Reference to the remarks about jamming the valve-stem by cocking the gland or setting it up too hard is appropriate in this connection. Packing is often set in wrongly; care not being taken by the engineer to break joints, so that where it is

cut badly there is a nearly straight steam-way through which leakage is very easy.

Still another reason for packing behaving badly is that engine-runners do not consider the difference between one kind and another. They will take a rubber packing and soak it in oil and see that it gets regular slushing with oil whenever possible. Now if there is any one thing by which India-rubber is not improved, it is oil; and of all oils none are so destructive as those which are wholly or in part mineral. Next door to an engine runner who is soaking his rubber packing in oil there will be a man who is using ordinary hemp braid or something like that, but he will never think of benefiting his packing by a good thorough soaking in oil over-night before putting it in the stuffing-box.

It will usually be found best for the engine-tender to run the gland up hard at first, before the engine turns over, then slack it back until there is just a tiny leak of steam—a gentle puff, during the first day; then the second day it may be set up a mere trifle, so as to leave only the faintest suspicion of a leak; and if I had my way about it I should let this little leak show as long as the packing was run. What steam came out through so slight a crack would cost but little and the wear of the rod and packing would be less, while the power consumed by friction would be more than enough to pay for the steam. Besides this there is some slight lubricating power in the steam and water.

Sometimes there is trouble in vertical engines, where the lost motion at crank pin and crosshead pin have let the piston down in the cylinder, and when that lost motion is taken up it will be found that the rod is worn to a shoulder, which shoulder will cut the packing at one end or the other according as the engine is an inverted one or not. In horizontal engines both the piston-rod and valve-stem packing are injured by the piston and valve being allowed to get out of line, thus bringing extra wear upon one side only of the packing and rod or stem. Of course there are some very bad packings on the market. Some of them are not fit to throw at a cat. I remember one that was in the engine of the Cornell Iron Works in Centre Street, New York, which was baked like terra-cotta, and had to be taken out with a cold-chisel.

It is about as well not to do too much experimenting. The stationary-engine owners might, in this matter, take a lesson from the railway men. I would sooner try to sell the devil an orthodox Life of Christ, or a rank Prohibitionist a barrel of apple-jack, than to undertake to sell a new rod packing to a railway purchasing-agent, master mechanic, or superintendent of motive power. Every man Jack of the railway fraternity seems to want the other fellow to do the experimenting on the other railway.

I might switch back to the question of the packing that got baked hard in the stuffing-box and say that it would be a good idea for engine-builders to devise or adopt some system of split bushing for their stuffing-boxes, by which the whole business might be drawn out—packing, bushing and all—and taken apart outside of the stuffing-box. It would not be a very difficult matter to put in a bush which could be drawn out by screws driven through the glands, the glands, bushing and packing being backed out just as the gland alone now is.

I might say that there are very few packings, whether hemp, rubber, metallic, or what not, which would not be made to last longer by the liberal application of powdered graphite (black lead plumbago) of good quality, the coils or rings being rolled in it before being put in place; and the liberal application of it to the rod before surrounding it with the coils would benefit both the rod and the packing.

Nearly all the remarks that I have made here apply to valve-stem packing as well as to that for piston-rods.

THE EVOLUTION OF THE HOSE-REEL.

By Walter G. Chase.

WITH the introduction of water-works into the smaller towns came the demand for what is known as garden-hose. The purchasers of this sinuous luxury no doubt believed that it could be handled much as they had used the old-fashioned green water-pots; but in practice they learned better. It looked very harmless hanging in graceful coils on its peg by the side of the house, but once taken down and started across the lawn, it developed a capacity for kinks and twists that was maddening. A muscular gardener, to be sure, could hang it over his arm and walk away with it, giving a twirl for every coil that obviated kinks, but that required both strength and skill. It therefore came to pass that a winding arrangement was wanted, and then and there the evolution of the hose-reel began. Whether the peg by the wood shed, the crook of the gardener's elbow, the wash-tub reel, the barrel reel, or any of the score of the home contrivances really germinated the idea of the perfected reel, it is difficult to say; at all events they were all used, and, let us say it thankfully, their day is past. To-day the reel in all its effectiveness and cheapness comes from the West by the car-load, and is found wherever there is water and hose.

The hose-reel in its pristine simplicity is shown in Fig. 1, which the manufacturer has christened the "Cyclone." He evidently knew the strong point of the reel when he gave it this expressive name, for the energy with which it unwinds hose when once started is certainly

suggestive of Dakota zephyrs. It is quite natural that the next step taken should be towards providing a reel that would unwind the hose as fast as the person dragging the reel could walk. This was accomplished by an ingenious arrangement of gears connecting the axis of the reel with the axle of the carriage, as shown in Fig. 2. Of course this winds the hose as fast as the carriage is run when "reeling in" and is so good a device that it is rightly called the "Ideal."

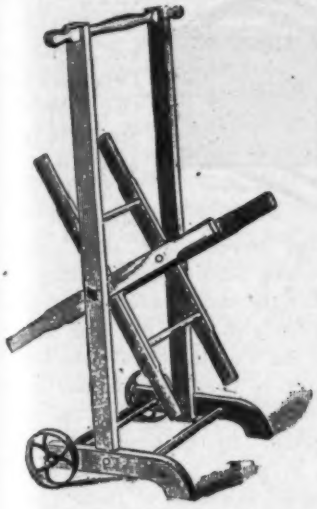


FIG. 1.—THE "CYCLONE."

It is not in gardens or on lawns alone that hose is used and reeled. With the factory requirements made by insurance companies, and the State laws providing for the safety of hotel guests in case of fire, came a demand for some means of stowing away lengths of hose in such a manner that one end should be coupled to the service-pipe at all times, and the nozzle end ready to be drawn immediately to the fire. In other words a stationary reel was called for. The first type of this reel consisted of a mere drum upon which the hose was wound, and, when stretched out wasted the time necessary to connect it with the water-pipe. This was not the only fault of the reel, as a ludicrous incident proved. A small blaze occurred at a hotel at which I was stopping and the alarm was sounded. An excitable individual rushed for the hose in the corridor, seized the nozzle, tore down the hall and stairway, never stopping until he had gone several times the length of the hose. He was finally stopped, the rear end of the hose carried back and coupled and the fire extinguished. That delay, however, might have meant thousands of dollars in extra damages.

In the Thurston reel, shown in Fig. 3, no such mishap can occur. The water-supply pipe is connected with the axis of the reel and this in turn with the wall end of the hose, so that the water is delivered immediately from the nozzle, whether one foot or the whole length of the hose is unreeled. An automatic arrangement is provided, if desired, whereby the moment the reel revolves the water is turned on, or the fireman may open the valve shown in the the cut before unwinding the hose. This class of reel is best adapted for rubber, or rubber-lined, hose, as that preserves by its rigidity its circular form. In fact, such hose is a necessity, as the consequences of turning on a heavy head of water into a reel full of flat linen hose would be disastrous in the extreme. Flat linen hose may be used on this reel, but care will have to be taken to see that the whole length is unwound before turning on the water.

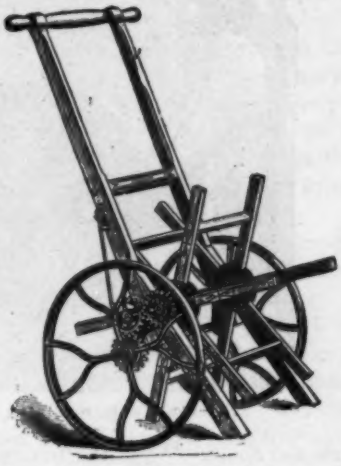


FIG. 2.—THE "IDEAL."

One more step still remained in the evolution of the reel. Suppose that any of the above stationary types is placed in a hall-way, and that the hose requires to be pulled in a line at right angles to the direction of the reel's axis; one man will have to stand in front of the reel and pull off the hose, while another runs away with the nozzle toward the fire, or it will have to be uncoiled first on the floor. A swinging bracket seems to be a simple thing in such a connection, yet it was not until last year that such a one was patented. The advantages of this are obvious, and although Fig. 4 only shows it as adapted for linen hose, yet it is made for any description of hose. While speaking of linen it is well to remember that this class of hose has brought out a style of reel, or to speak more properly, bracket, which is entirely separate from any other. This is shown as a type in Fig. 5, and is probably a direct descendant of the wooden shelf which was formerly seen in the hotel corridors, on which the linen hose was stacked. In this there is the advantage of the shelf, combined with the pivot which swings it into line with the direction in which the hose is drawn. When not in use the bracket is swung against the wall.

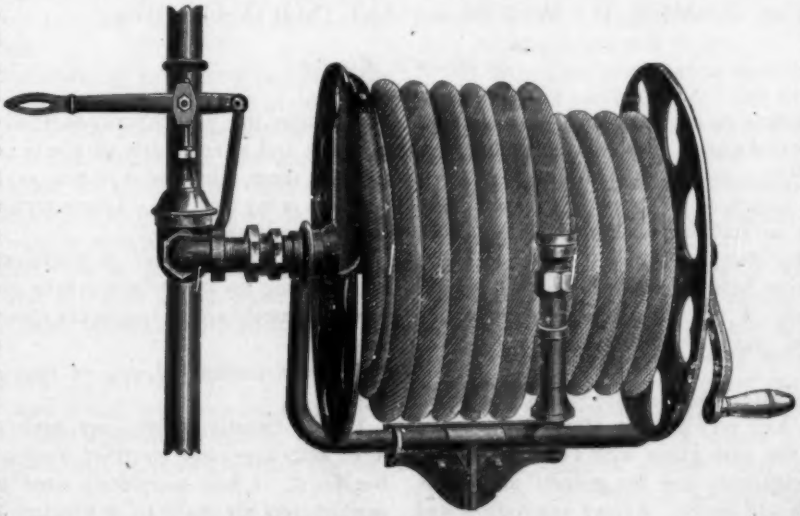


FIG. 3—THE THURSTON REEL.

The reels shown in the few cuts used are of course types, and do not cover even a fraction of what inventors have produced. There are, however, only about twenty different styles on the market to-day. Probably 95 per cent. of those in use are wooden reels and are made in the West and South. While the business is a large one, and orders are placed for 3000 at a time, but few manufacturers make them.

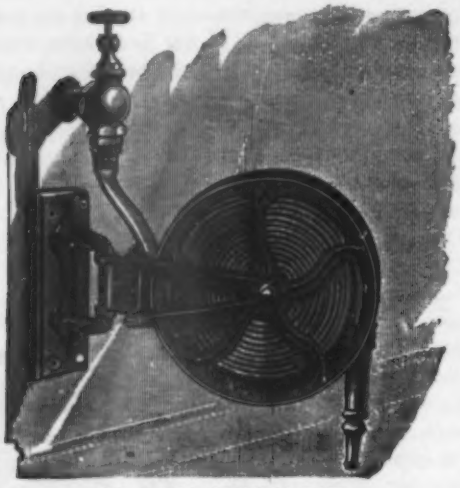


FIG. 4—REEL WITH WALL PLATE.

As a rule the largest makers have some kind of wood-working concern that leaves them a quantity of strips and odd pieces, that are just right to make up into reels, but are of little use in any other way. This explains why a prominent wood-worker trying to get an order for making up reels found his lowest possible bid, $1 40, forty-five cents above a Western concern's figures with the goods delivered in Boston at that. The hose-reel season begins in December for the Middle States, in January for New England. Most of the large buyers have their orders in long before April, which is when the small trade begins, particularly if it be dry and dusty. By the Fourth of July the small trade is over and no one need look for any more until the next season. By the time this article is in press "Old Hose Reel," who is perhaps the best known salesman of these goods, will be visiting the buyers in the East, calling them all by their first names and selling his goods by the carload.

FIG. 5—BRACKET REEL FOR LINEN HOSE.

MEN TO WHOM I HAVE SOLD GOODS.

By Henry F. Knowles.

QUEER experiences do not come every day, nor are they to be found when a man goes out to hunt for them; nevertheless every man has them, and none more than the Commercial Tourist. I do not claim that mine have been so startling that I can set up for an accomplished *raconteur*, but they interested me, and I love still to chew them over between whiles. When I can get the right listener, also, I tell them over, and as a rule start the other fellow and get some very meaty tales in exchange.

My first anecdote dates back to 1867, when I had just begun to travel. I had very definite ideas as to how a man should dress, the easy grace with which he should greet a prospective customer, and the general impression that his "shape" should make. At my suggestion, and under my personal supervision, our company had gotten up for me an elegantly-engraved business card, with my full name standing out as prominent as a Hebrew nose. On my way to New York I took that card out many times and gazed on it lovingly, and my heart swelled within me to think that it was my name, and my card, and that I was its permanent travelling companion. Early in the morning, with confident step, I entered a Cortlandt-street store and sought the proprietor. As I reached him I took out my card, and after a hasty glance to be sure that my name was still there, I handed it to him, saying:

"This is my card, sir. I have certain specialties that I would like to show you."

Without looking at me or my faultless get-up, without even reading my beautifully-graven name, he deliberately tore the pasteboard to fragments, threw them on the floor, and said:

"I want nothing of you or your card! Get out of here!"

I got. Quietly, slowly, my pride all gone, my heart filled with rage and mortified vanity. I drifted back to the hotel. I was completely used up, and would have surrendered my scalp to a wooden Indian if I had met him suddenly. However, I recovered and got out among the trade and sold quite a lot of goods. And now comes the part of my tale that I love to dwell upon. Several weeks later I was again in New York, and in the office of a large wholesaler who handled lots of my goods. As we stood talking who should enter but the fiend who had insulted me and my card. I was introduced, and he at once remarked that he was buying my goods from the whole-

saler, but at his suggestion would like to buy them direct. What was my price?

"Seventy cents a pound," I said.

"Why," said he, "I am buying your goods of the wholesaler for sixty-five cents; why do you charge me more?"

That gave me the chance that I wanted, and I told him briefly and succinctly just why I did not care for his trade. I felt independent, for we were at that time the only concern making those goods, and he was obliged to buy them at second-hand for years.

It was always my custom, in going into a strange place, to seek out some small dealer and obtain from him the facts about the largest buyer in the town, and to learn if possible his peculiarities. One whom I found out about was a man who was complaining that he was continually run to death by drummers. He had said that he had never met a drummer who knew how to state his business and get out quick enough. Acting on this, I called there with my briskest air, having only fifteen minutes to transact my business and reach the depot, some five minutes' walk from his store. I accosted him with:

"If you will give me about two minutes of your time, I will convince you that I am the man for you to buy your rubber goods of," rattling this off like lightning.

"What have you got to say?" he asked.

I then told my story as briefly as possible, hardly giving him a chance to open his mouth, and inside of five minutes I took his order for a number of thousand feet of hose, and was at the depot waiting when the train arrived. This was my first and only sale to that party. He told me afterwards that I took him so unawares that he gave me the order unintentionally; that he had traded with a New York house for years, and that was the first time he had ever parted from them.

It is a genuine satisfaction to get even with a man who has snubbed you. If one can do this and at the same time make a business friend of the offender it puts fat right on the ribs. How well I remember one fine morning entering a store at 8 o'clock all primed and eager for business. The place was owned by two brothers, and seeing one I asked if they were in want of any rubber goods.

"We are," he replied, "but my brother does the buying. He will be in soon, and will give you an order."

Soon the brother came in and I accosted him and he said:

"Wait a few minutes and I will see you."

I waited an hour and a half and then went and told him if he wanted to talk with me on rubber goods he would have to talk quick, as I proposed to take the next train for another city.

"You can take the train, young man, any time you see fit; we are not in want of any of your goods and when we are we know where to buy them," was his answer.

With an extra show of courtesy I bade him good-day and told him I would call again. Indeed I then and there determined that I would visit that man every chance I got and get an order out of him finally. I followed him up every two or three weeks for months, and finally he placed an order with me for some two hundred pounds of packing at twenty-two cents a pound, paying "cash ten days" for the goods. I continued calling on him. Some few months afterwards he said he was short of goods and wanted about the same quantity that he had before.

"By the way," he asked, "what is the price?"

"Sixteen cents a pound."

"Has there been a reduction in price?"

"No," I answered.

"Why, you charged me twenty-two cents a pound for the last."

"I know it," I said; "some six months ago you kept me waiting in your store two hours and then told me you wanted none of my goods, and that I was at liberty to take the train at any time I liked. I charged you $6 an hour for staying in your store. Did I charge enough?"

At first he was indignant, but finally laughed at it, and he has been a good customer from that day to this.

About ten years ago while in Portland, Maine, I dropped in to see one of my customers, who is not a tonsorial artist, although his name is suggestive of that calling. As I sat awaiting him, a travelling friend by my side, I noticed a particularly handsome owl sitting asleep in a cage, but a few feet from me. The notion took possession of me to wake it up and see if it would squawk. So I took several pieces of rubber out of my bag and slyly shied them at the bird, but couldn't stir him.

"Poke him with the yardstick," whispered my friend.

So, with many a cautious glance at the owner, I insinuated the stick between the wires of the cage and gave it a vicious punch in the ribs, if owls have ribs, but the bird never winked. At that instant glancing over my shoulder I saw the clerks gathered behind me and almost in convulsions with stifled laughter, while the proprietor looked up from his ledger and said dryly:

"It will take a long time to wake up that bird, old man. It's been dead and stuffed for over five years."

That was one of the times when a man that I have often sold turned around and sold me.

Rubber versus Leather Belting.

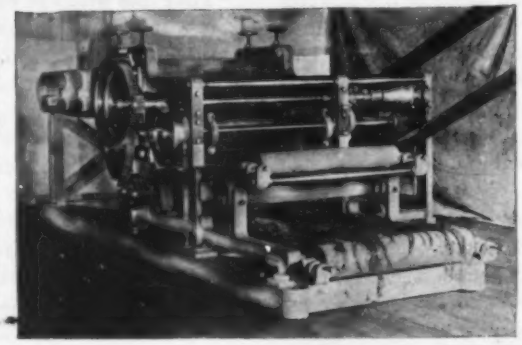
THERE is much discussion of late as to the relative merit of belts and the conditions which influence their value as a coefficient in the transmission of power. Leather seems to be fickle, doing better at one time than another, but as a rule, with one or two exceptions, the rubber belt is by far the more satisfactory. The principal exception is in dynamo-work, where a great deal of oil is used. This softens rubber, and renders its use impracticable. In the usual use the rubber is flexible, a coefficient sought among the differences in leather-belting. Its friction is greater and it does not slip. Again it is not affected so much by moisture which makes the leather belt vary so much in its work done at times. For out-door work it is for this reason especially advantageous. There is one point, however, and that is get a good one; one of the other sort made of everything except which its name would signify is no better than leather, if so good.

RAMIE FIBER IN HOSE, PACKING AND BELTING.

By Frederick W. Heustis.

THE strength of rubber hose depends largely upon the fabric that is employed in its manufacture. The fabric used to-day is either cotton duck or linen, and as a rule has been carefully manufactured ex-

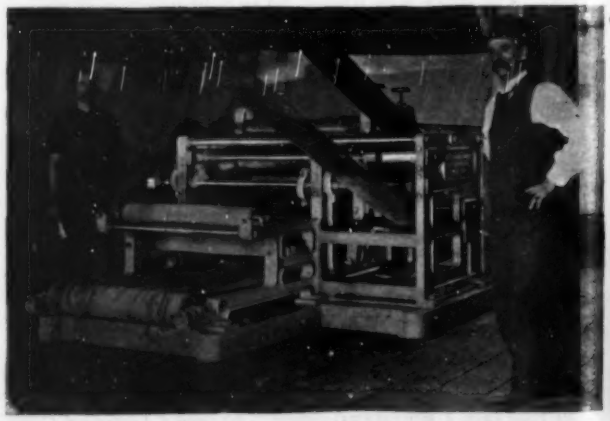
pressly for the rubber trade. When used in hose, it is skillfully and carefully treated so that it may not mildew or rot, and is then impregnated and covered with rubber and becomes what is known as rubber hose. Or, it may be that the cotton is simply woven into a jacket or a number of jackets that cover a rubber lining. In this case of course the strength of the hose depends almost entirely upon that of the woven covering. Strong as rubber-and-cotton hose is to-day there is a call for greater strength.



Light and strong hose is the desideratum, and manufacturers are at their wit's end to accomplish more than they are now doing in these two particulars. Suppose now, a fiber were offered to these ambitious men that should show eight times the strength of cotton? Suppose it be a fiber easily worked and of reasonable cost? Ought it not to interest the hose-maker? Another line that calls for a stronger and more durable fiber is that of packing. An ordinary form of piston-packing is the gum-core, having a covering of jute and an additional outside covering of cotton. Both of these coverings, which may be woven over the core or simply wrapped around it, are treated with oil and plumbago, or other preparations for purposes of lubrication. Asbestos covering is often used, but this also needs the oil and plumbago treatment to keep it from caking. Now it is desirable to find a fiber that will stand more heat than cotton, more wear than jute, and that will not cake as asbestos does.

Then there is belting. Three things go to make up a good rubber belt, as far as its fabric is concerned—strength, durability, and freedom from stretch. On this latter point, one has only to examine the ponderous hydraulic belt-stretchers, that are used in all mills where rubber belting is made, to realize the pains taken to draw the fabric out to its utmost limit of elasticity, and keep it there until the vulcanizing rubber binds it fast. There is needed, therefore, a fiber for this work that is infinitely stronger, that has an enormous amount of durability, and that has no stretch. It would be an excellent thing also if this ideal fiber were free from all possibility of rot or mildew through the action of dampness. Indeed, for hose, this would be very desirable, for when it is a little worn its fibers are continually exposed to mildew; and rotten hose almost always means a water-rotted fabric, rather than damaged rubber.

A fiber, then, is called for in the rubber trade that has far more strength, greater wearing qualities, lightness, and absolute freedom from stretch and mildew. Such a fiber is known and is even now being grown and prepared for market. Like all valuable productions it required time and thought to solve the whole problem of its preparation. This fiber is known as Ramie and comes from a plant that belongs



to the nettle family—the *Boehmeria utilis*. By a process of hand-stripping the oriental nations have long used it for making the most beautiful and lustrous cloths. A curious discovery, through the chemical analysis of mummy

shrouds from Egypt, proves that it was used in the land of the Pharaohs, where there was need of durability above all things. The Ramie that is to-day on the market in this country is grown in Cuba, where there are large plantations of it. The plant matures in thirty-five days after sowing, and five crops in a year can be taken from the same plantation. The stalks of the Ramie plant are from four to seven feet high and half an inch in diameter, and have outside of the pith, a long, fine, silk-like fiber, in fact the longest of any plant not excepting sea island cotton. The main processes of treatment after harvesting are the stripping of the stalk by the decorticator, degumming, bleaching and spinning.

RAMIE PLANTATION IN CUBA—FIFTEEN DAYS' GROWTH.

The fibers lie parallel, being held together by gums and protected by the outer bark, a core of pith running through the middle of the stalk. The actual length of the fiber after degumming is from two and one-half to four inches. To-day in China and Japan the Ramie plant is very highly valued, and after the bark has been removed by hand, the fibers are washed, dried and spun into thread and cord, which is made into nets and cordage by the slowest and most painstaking processes. They also make a very fine fabric of it which is used for summer clothing and highly valued for that purpose, being known as "hiapou."

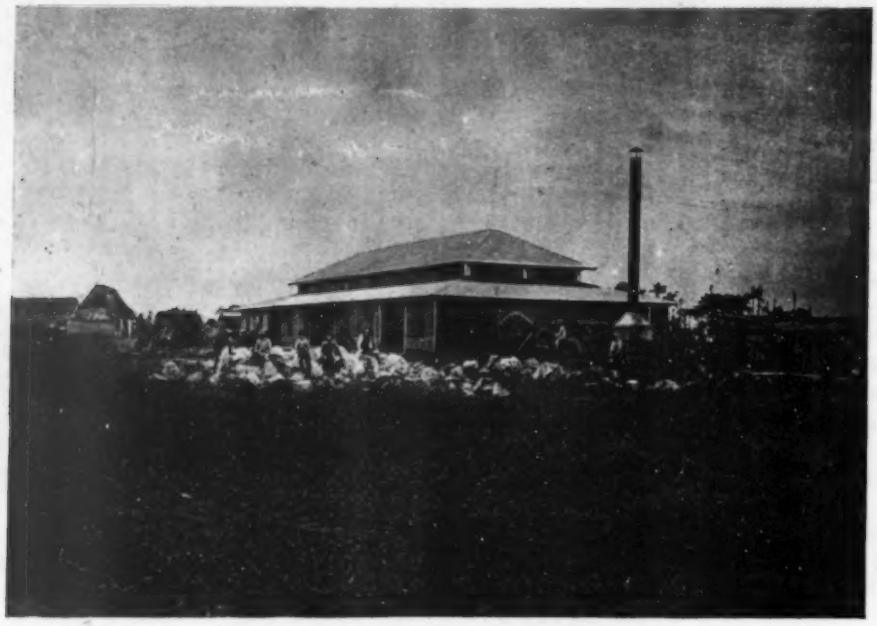
RAMIE PLANTATION—THIRTY-FIVE DAYS' GROWTH.

As Ramie has shown such tremendous comparative strength and lasting qualities, it cannot but find a very large place in the mechanical arts. The French Government expert on fibers, Dr. Ozanam, very carefully tested it, and gives the following table of resistance to breakage: Ramie, 100; cotton, 12; silk, 13; hemp, 25, and flax, 36. From this it will be seen that Ramie is more than eight times as strong as cotton that is used in cotton duck. When this same fiber was tested by what is known as the washing process, Ramie stood two hundred and fifty washings, while flax broke down under eighty washings. A curious feature about this fiber is it is even stronger when wet than when it is dry.

An English spinner in this country recently got some Ramie thread and had stockings made of it and was amazed to find they had such wearing qualities that it seemed almost impossible to wear them out. No doubt there are those who would like to discover equally good qualities in other kinds of hose.

It is said that there are parts of our own country where the Ramie plant would flourish, and the State of California having recognized this fact, has voted a subsidy of $10,000, to be paid out in bounties to encourage its culture. The cost of this remarkable fiber is somewhat more than that of cotton, as it is marketed to-day. It has, however, features of such special excellence, in its connection with rubber, in the manufacture of cotton hose, steam-hose, belting and mechanical goods of all kinds that contain any fabric, that it is sure in time to have a long lead over weaker fabrics.

The engravings on page 102 represent various views of the latest improved Ramie-decorticating machinery of American manufacture.



DECORTICATING BUILDING ON A RAMIE PLANTATION.

RUBBER GOODS IN HARDWARE STORES.

By I. A. Sherman.

SO soon as the hardwareman finishes his annual inventory, usually in the latter part of December, or a week or two later in the new year, he begins to think of his requirements for the coming season, and among them is a supply of mechanical rubber goods. Before this adjustment of balances, debits and credits, he has allowed his stock of rubber goods to become very low, as is customary with most other articles, although in the case of rubber manufacturers there are special reasons, due to the season, for example, for not keeping on hand a full supply at all times. Hardwaremen have time out of mind kept a few rubber specialties, but it is only until within the past few years that they have increased their lines to the extent of making this an important item in their trade.

A score of years ago a little garden-hose was all that could be ventured, and there was good reason for a paucity in the demand. It is not until towns begin to have water-works that a good demand for hose is to be expected. The larger cities, including those down to the 100,000 limit in population, have had water-works for a long time, and the carrying of a line of reeled small hose has been profitable, but it is not until within the past decade that the smaller towns with any degree of unanimity have possessed themselves of water-works, and that the demand for hose in such towns has been worth attention. As it is now the mechanical rubber-goods manufacturer does not, in his effort to secure business, permit his salesmen to let the magnitude of an order from a great elevator eclipse the humble wants of the retail hardwareman, and the latter is visited as regularly as is practicable. The number of small traders of this sort in the United States is beyond computation. There are estimated to be about 33,000 hardwaremen, but the needs of small communities are so variable and complex that the number of people dealing in a full line of hardware is not by any means confined to those making a specialty of that trade.

Garden-hose is now also found in the hardware departments of the mammoth dry-goods stores which have sprung up like mushrooms in every large city, and the list is being extended gradually to mats, door-springs and all the other rubber specialties needed particularly by the housekeeper. Indeed the list of buyers for retail is so long that a certain manufacturer, who takes special pains to cover it once a year, sends through the mail at that time upwards of 125,000 envelopes containing circulars which describe his specialty in the line of hose. This probably would give some idea of the demand in one way or another for the various lines of mechanical rubber goods, and although some thousands of his customers are railroaders and mill-men, who buy direct, and not dealers, still a good proportion of the demand comes from the smaller stores.

Although 5000 feet of hose is a large quantity to handle in any season by any one man, still it is the aggregation of the orders which make the immense amount of hose, as well as other rubber goods sold in the country, and the hardware jobber does his part in distributing it. The mammoth concerns which have lately evolved in the larger cities of the country also handle a large amount of mechanical goods, and their orders are in very handsome proportions. This is more apparent when one gets away from the agencies of the various companies, hardware jobbers not paying much attention to rubber goods trade when the smaller dealer can obtain his supply from a house devoted to that specialty in the same or the next block.

The different articles which the hardwareman keeps varies with the locality. One who has a trade in a residence district in a city would hardly care to take into stock much packing or belting, though these would be of interest to the man near a number of small manufactories. The merchant on Hudson river might carry a full stock of ice aprons while the Sixth-avenue man would wonder what they were. So the variation would go through the list, but generally speaking hardwaremen are now carrying in stock belting, garden-hose, packing, cement, gaskets, wagon-springs, door-springs and tubing, but for such articles as diaphragms, steam-hose, wringer-rolls and all articles running into money and for which calls are infrequent, the order is well in hand before it is passed to the manufacturer or jobber. In another line of goods which is very inviting to the hardware-dealer, and belonging to him, are cork-screws with rubber handles, tumblers of hard rubber, martingale-rings, oilers, beer-glass stands, spittoons, carriage-cloth, curry-combs, shaft-rubbers, prop-blocks, window-cleaners, floor-scrubbers, counter-cleaners, submarine armor-fittings; beer, soda and other pipe; force-cups, chair-tips, furniture-fenders, door-bands; buckets, pails and the long list of mats which are now used for so many purposes. The list could be extended indefinitely, but the trouble which compels the hardware-dealer to ignore in many instances articles which he could readily sell if displayed, is that the variety in his own particular line of hammers, hatchets, screws, nails, etc., is so large, consumes so much space, and requires so much capital, and is so necessary to keep trade in a live condition, that the rubber line seems by comparison not worth trying to develop.

The salesman who can plant a rubber specialty which is legitimately in the hardware line and at the same time a good seller, into a small store, has only to go over the ground again to get the neighbors to buy the same article. The article of mats is getting to be very popular with the people at large, and yet to carry a stock of them in any variety absorbs no little capital. Fifty yards of matting are worth at retail $75, and that is only one roll; perforated mats are worth $1 per square foot, and so on, and the small dealer who must keep all the old-time articles, or relinquish the business, hesitates before he takes on a line of goods of this sort. Rubber-men are complaining of this, and say that mats are selling more slowly than they ought. Of course there is the matter of credit, but the hardwareman is used to short time, and would think that the millenium had come if he obtained anything like the accommodation given in the shoe business. Of course, such a system of credits as prevails in some branches of the rubber trade could not be followed without a better knowledge of the rank and file of the hardware dealers, but that will adjust itself in time, and as it does, the hardware trade will become more and more in line for the distribution of additional lines of goods.

One thing noticeable is that the hardware man is buying better goods, from time to time. Customers have learned to ask for quality, and view with suspicion any cheap goods. The hardware-dealer, shrewd in his way, is learning to buy cheaply and charge a good profit in the rubber line. If he sells poor goods he cannot hold his trade in metal specialties and staples, so the better class of fabrics are beginning to pass into the hands of the ironmonger and none other are kept. The only exception to this is that for patching-up old hose an inferior quality is kept, a variation that can be readily understood in its practicability.

Very few goods are carried over from one season to another, dealers understanding fully that age does not improve rubber compounds. Towards the end of the year stocks are allowed to run down in everything, and care is taken to keep only a bare assortment. Then a new buying for the spring trade comes which lasts until June, earlier or later, according to the general state of prosperity, afterwards a lull occurs until September when the second season begins. The volume of trade of course varies with the season. New buildings with new people make a brisk trade in many articles; manufactories with plenty to do call for belting and packing, while in depressed times the reverse is true. One thing certain is that the business from time to time is expanding largely, and its course upward at intervals is in bounds and jumps.

THE TRADE IN PHILADELPHIA.

[FROM OUR RESIDENT CORRESPONDENT.]

THE keeping of rubber goods in stock is not an important item in either the wholesale or retail hardware houses in Philadelphia. The only rubber goods they sell to any extent are different varieties of hose, and that only in cer-

tain months in the year. The jobbing houses which do, to any extent, handle rubber goods, find that hose is salable only in cities and in towns having water-works. The salesmen of the rubber-manufacturers visit the trade and can, of course, sell much cheaper than the man whose goods come through more hands. Another reason why they do not care to meddle in rubber goods is that the business is a distinct one in itself, and requires much time and attention to make it profitable. Thus close attention is required lest the deliveries of goods should prove inferior to the samples. The cheaper grade of rubber, the hardware people claim, will deteriorate in value if kept any length of time, though the houses handling finer goods do not have this trouble. There is little profit in the sale of rubber goods by hardware firms in this city, so to save time, bother and risk of having a stock on hand, they in nearly all cases turn their orders over to the rubber houses, which can give the best goods for the least money. The few firms who sell rubber with their other lines complain that the majority of buyers do not care to pay a fair price for a fair article, preferring to run the risks of buying inferior goods at a cheaper figure. The general opinion of Philadelphia's hardwaremen seems to be that as rubber goods form a distinct line from their own, they ought to let the rubber-manufacturers take all the orders; "live and let live" appears to be their motto.

At the establishment of James M. Vance & Co., one of the largest jobbing firms in hardware in Philadelphia, Mr. Peters said to your correspondent:

"We receive from time to time a variety of orders for rubber goods, which we immediately turn over to the nearest house making a specialty of that line. We could not by any means compete with them in prices and as none of us here know anything about the making or buying of rubber goods we much prefer to let that end of the hardware business—if such it may be so called—severely alone."

The Supplee Hardware Co., No. 503 Market street, state that they have carried a side line of rubber goods for the last ten years and sell the greatest quantity of cheaper goods. In regard to cheaper goods becoming bad stock, if kept for any length of time. Mr. D. W. Supplee said:

"We prefer to sell out the entire stock if possible. By watching very closely we manage to save a good deal that would otherwise have turned on us. In the better grades we find no trouble at all about keeping goods. We have no special way of advertising our rubber goods; we let our salesmen do all that. As a rule we only sell in large cities and towns which have water-works, and the majority of our stock is sold in this city. Prices have been going down steadily and quality with them, but this is in the main the fault of the consumer, who will not pay a price which would insure him a good article."

Buehler & Bonbright, No. 427 Market street, handle no rubber goods whatever. They receive a number of orders for hose during the season, but prefer to turn them over to some well-known wholesale rubber house.

Newlin, Knight & Co., No. 337 Market street, carry a small stock during the season, principally hose of the cheaper grade, but not enough to warrant them to talk as if they understood that business. It is more for the convenience of customers than anything else.

Matlack & Colemen, of No. 203 Market street, who do an extensive wholesale and retail hardware business, have carried rubber goods in stock for twenty years and sell more of the cheaper grades than anything else. Mr. Matlack said:

"We find considerable trouble in keeping inferior goods over the season and try to sell out if we possibly can. The finer grades keep well, and I have not noticed that they deteriorate to any extent. We do not employ any special means of advertising rubber goods during special seasons, just taking the samples with our other lines. I distinguish between shoddy, and the best rubber goods by taking the samples apart and examining the actual body of the rubber, seeing if it is elastic, and by that means form a pretty fair estimate of the value. Do the goods of to-day compare with those of the past? Well I should say not. They are cheaper and inferior all the way through, but that may be set down as the fault of the purchaser of the hose rather than of the manufacturer, for of late people will not pay any kind of a fair price for a well made article."

Rogers & Miller, No. 135 Market street, fill orders for customers as a convenience, but do not keep rubber goods in their store at all. I. J. Fenley, No. 501 Commerce street, finds no sale for rubber goods, and would not care to push them if he did.

The Biddle Hardware Co. receive a few orders from customers which they immediately fill at the neighboring rubber house that makes the best price. There is nothing in rubber to keep it in stock, they say.

Charles M. Griskey, No. 508 Commerce street, do not keep rubber goods in stock, preferring to place all orders they receive with a rubber house. There is, they say, so much deception and trickery in the manufacture of rubber goods, and not thoroughly understanding the business, they think it wiser not meddle in the field at all. Seltzer-Klahr Hardware Co. will not keep rubber goods in stock.

A. B. A.

THE TRADE IN MINNEAPOLIS.

[BY OUR RESIDENT CORRESPONDENT.]

THE hardware merchants of Minneapolis handle very little rubber goods, and have not for several years, having been crowded out by the exclusively-rubber houses. Of these there are three, the Cleveland, Revere and Goodyear, with a fourth, the Nott, handling both rubber and leather extensively. Hardwaremen do not complain at this state of affairs, as they say the money formerly used in handling rubber is invested to quite as good advantage in other lines. Mr. Janney, of Janney, Semple & Co., says that his firm have handled no rubber goods for three or four years. Ten or a dozen years ago they did an extensive business but they gradually dropped it, as the exclusively-rubber houses began to come in. Below are interviews with a number of leading hardware firms which show their practical abandonment of the rubber-goods field, yet there are one or two practical suggestions given.

Joshua Williams, No. 102 Hennepin avenue—"I am not carrying a line of rubber goods and have not in the past. We sell, however, a good many rubber bumpers and rubber rattlers. Rubber goods will deteriorate in stock. The goods of to-day are nicer-made and better-looking than those of the past, but they don't last as long. They are cheaper now and we sell more of them. The manufacturers, in my opinion, have cheapened the goods too much and made the quality too poor. Some of their goods we sell seem to have the rubber all out of them, and are more like cork or rotten wood than rubber. In the class of goods we handle steel is coming more and more to take the place of rubber, and it will eventually largely crowd rubber out entirely unless the rubber-manufacturers increase the quality of their product."

H. B. Gardner, No. 18 Fifth street, South—"I have never carried rubber goods. I keep a little hose in its season, but do not feel competent to speak of the trade."

I. B. Kinne & Son, Nicollet avenue and Seventh street —"For three or four seasons we have carried a line of rubber hose. We never carry over rubber goods from one season to another. We undertake to handle good goods. If they are poor we tell customers so. So much 'shoddy' hose has been sold in Minneapolis that it has almost killed the trade. People have got the idea that they can buy good hose for 6 or 7 cents, but it is absurd."

A. R. Miller & Sons, No. 304 Hennepin avenue—"We have carried belting but we now let the rubber stores monopolize the trade. They have absorbed the business and are welcome to it."

W. K. Morrison & Co., No. 107 Nicollet avenue—"We have kept garden-hose in stock for three years past. We don't carry any over from one year to another. We have reading notices in the daily papers and we put slips in letters and bills we send to our customers. As to quality we rely principally upon the people we buy the goods of."

T. J. M.

THE TRADE IN OMAHA.

[BY OUR RESIDENT CORRESPONDENT.]

OMAHA'S retail rubber trade is almost entirely looked after by rubber houses, and with the exception of garden-hose the hardware dealers pay no attention to it. I called upon James Morton & Son, Himebaugh & Taylor, and Lobeck & Linn, the three leading hardware stores of the city, which have been located here ten and sixteen years and one year, respectively, but none of them are handling rubber goods with the exception above noted. All complain of the weakness of hose, which frequently fails to stand the heavy pressure of our mains, and is thrown back upon their hands. They have to guarantee it, and so are compelled to make arrangements with the jobber to stand the loss. They handle the goods on consignment, so that left-over goods are taken back.

They profess to see but little change in price or quality of goods, and rely solely upon the brand to determine the merit of the article. They "understand" that all rubber goods deteriorate with age, but to what extent or what class of goods is most seriously affected, they are unable, owing to their limited experience, to say. The only suggestion that they can offer to manufacturers is that they furnish hose that will stand a pressure of 125 pounds without developing sieve-like propensities.

The Omaha Rubber Co. are undoubtedly doing the bulk of the retail rubber trade of the city and a voluminous wholesale trade as well. They advertise extensively, principally through the daily papers. As to sales, they do not report an extra heavy business in any one line, the demand changing with the season. They detect "shoddy" by their knowledge of the material, by skill and experience. Prices they believe to be lower, but quality as good as of yore. They are manufacturing more or less soft rubber goods—syringes, nursing outfits, etc.—which the present home-industry movement is doing much to popularize. E. C. H.

THE TRADE IN SMALLER CENTERS.

[FROM LETTERS FROM HARDWAREMEN.]

HARDWAREMEN in all parts of the country outside the leading trade centers have been invited to correspond with THE INDIA RUBBER WORLD in relation to their sales of rubber goods of every kind. From a large mass of correspondence received it appears that hardware-dealers generally keep in stock some sort of rubber goods, more attention being given, perhaps, to garden-hose than any other one article. There is the greatest variety, however, in the character of stocks carried by hardware-dealers. Some so-called hardwaremen are in reality general merchants, who may keep in stock rubber boots and shoes. Others may be electricians in a small way, using hard rubber in making or repairing apparatus. The following selections from letters received in this connection may be of interest to the rubber-goods trade, particularly on account of the very general complaint made by small dealers that they get hold of poor grades of rubber. It remains for the manufacturer of the better grades to undertake some sort of missionary work among the small cities and towns, with a view to educating the trade more fully into what constitutes good rubber manufactures and how to buy the same.

William C. Leavitt, Norway, Me., writes that he has sold rubber hose for five years past. He thinks that it is not so good when kept in stock until the second season. "Nothing but the best will answer here."

E. E. Jones, (general merchandise) Enfield, N. H., has sold rubber goods for three years, including boots and shoes and rubber coats, in which his principal trade consists. He finds that the cheaper grades of goods deteriorate after the first season. He is guided in buying by the brands of the goods and also by their appearance. He feels that rubber-manufacturers would be benefited "by using more rubber and less coal-tar and charcoal."

Foote, Brown & Co., Penacook, N. H., have carried a line of rubber goods fifteen years. Their goods do not deteriorate to any great extent if long kept in stock. They advertise such goods by attractive displays at their front door. They do not feel that rubber goods have improved in quality of late years, but possibly, they are not so good. They suggest to manufacturers to "put fewer 'seconds' on the market and hold the quality to A1."

Spencer & Co., Keene, N. H., sell small quantities of rubber packing, belting and hose, which they find to harden

by keeping in stock and thus become unsalable. They regard this as due to the quality of the goods, and this, again, to the disinclination of the trade to pay good prices for good rubber manufactures. They depend upon the standing of manufacturers for the quality of goods purchased. They find that the manufacturers who send out the best goods get the best trade.

Williams Winslow, Bennington, Vt., has carried a line of rubber goods three years, selling hose principally. He is careful not to keep any goods from one season to the next selling at any price rather than risk a loss through deterioration. He believes that the goods of to-day are about the same in quality and price as when he first became acquainted with the trade. He would suggest as a means of increasing trade, that manufacturers sell "better goods at lower prices."

Anthony, Cowell & Co., (house furnishing) Providence, R. I., keep rubber mats in stock.

A. H. & E. W. Abbe, New Britain, Conn., sell rubber hose, tubing and wagon-springs, which they find deteriorate with age. "As to these goods measured by the same goods fifteen years ago, there is no comparison. We used to get rubber hose that was good for eight to ten years' service, but two to three years is the average now."

John L. Lindsley, Orange, N. J., sells rubber hose and tubing, which do not lose their quality with age. Prices are, he thinks, quite as low now as in former days for the same grade of goods.

The Springfield (Ohio) Hardware Co. have carried rubber goods for twelve or fifteen years only, though they have been in the builder's and manufacturer's hardware business since 1840. They sell rubber belting, packing and cloths. Goods do deteriorate with them after a time. They pay some attention to advertising rubber goods as a special line. In buying they distinguish between good and poor articles by tearing apart samples, heating and so on. "Goods of to-day are altogether, with few exceptions, inferior to those of years past. We would suggest to manufacturers to quit trying to force quality at the expense of prices, as buyers understand that the time has not yet come when you can buy something for nothing."

The Banks Hardware Co., Henderson, Ky., write that while it is the custom of many hardware-houses to carry rubber goods to some extent, they have never done so. Thompson, Clark & Co., wholesale and retail hardware-dealers at Port Huron, Mich., make the same statement.

H. Raymond, Racine, Wis., has carried a line of rubber goods for twenty years, selling mostly hose and packing. He has found that these goods deteriorate, and that the goods of to-day do not compare in quality and price with those of the last. He advises manufacturers: "Make better goods, there is too much shoddy put in, old rubber, sulphur, coal-tar and anything to fill up."

The Wyeth Hardware Manufacturing Co., a large concern at St. Joseph, Mo., write that they sell comparatively nothing in the rubber-goods line.

S. & W. Scott, Floyd Court House, Va., have sold rubber goods for ten or twelve years, having had a larger demand for rubber shoes than for other articles. They find that these goods deteriorate, and think that the lower-priced goods, particularly, are not equal to what they formerly bought. Thomas G. Brady, Clarksburg, W. Va., does not handle rubber goods of any sort.

Thompson, Lang & Co., Hillsboro, Texas, sell rubber belting, grain-tubes and buggy-shaft rubbers. They advertise these articles specially in the local newspapers.

A. E. Deloust, Ocala, Fla., has been selling rubber goods eight years, finding the better qualities chiefly called for. He does not think that goods to-day compare favorably in quality and price with those of the past. He suggests the branding of hose and belting every ten feet with their grade, and also the use of the same terms by various manufacturers in describing their products.

Henry F. Hubbard, Omaha, Neb., has sold rubber goods for ten years. He buys only from one of the larger manufacturers, whose representations he has learned to depend upon. He keeps a close watch upon his stock, and thus prevents any goods from deteriorating. He finds it unnecessary to advertise good rubber goods specially, because they advertise themselves. Speaking of the products of the company whose goods he sells, he says that they are equal to-day in quality to anything that they have ever offered, and the price is lower. "The only thing I can suggest to increase trade and satisfy customers is to stop the manufacture of cheap rubber goods."

W. F. Schatz, Gray's Harbor, Washington, has never sold any rubber goods on account of a limited demand for them. F. E. Johnson, Tacoma, Wash., keeps in stock only hard rubber for his work on electrical appliances.

Bent & Cohoon, New Glasgow, N. S., who have a general hardware store, have been selling rubber belting for eleven years; also to a small extent rubber mats, bumpers, anti-rattlers and hose. They find the quality of goods much better than heretofore, and aim at buying only the best in the market,

While a great variety of stationery is used by hardware-dealers who have addressed this office, pointing out on their letter-heads the various kinds of goods sold, it may be mentioned that none of them seem to regard their rubber-goods as of sufficient importance to justify advertising them in this matter.

ONE SALESMAN'S TESTIMONY.

"I TELL you," said a prominent rubber-salesman, "our hardware trade is about the best we sell to. You see they are men, as a rule, who buy lots of goods, who carry big stocks, and work on very small margins. The big New England concerns that make all kinds of small metal goods that the hardwaremen handle, turn them out in such enormous quantities that there is little margin of profit in them; especially as the big concerns are continually fighting each other. Now then, when the rubber portion of a hardwareman's business is scrutinized what does it show? Why a neat little business that nets a profit of from 30 to 60 per cent. To be sure, it is a business that runs to seasons, but while it lasts it is mighty profitable, and is very little extra care. That is why they are such good men to deal with. They hail the rubber-man as one out of whose goods they make a legitimate profit, and treat him accordingly."

THE CHEMISTRY OF RUBBER INGREDIENTS AND ADULTERANTS.

*By Henry J. Williams, Chemist.**

I.—WHITING AND PARIS WHITE.

NEARLY all inert mineral substances which are used with India-rubber as admixtures make it, in time, hard and inelastic. Whiting and Paris White, if of good quality, are probably the least objectionable substances of this class used, and they enter so largely into its composition that they have come to play a most important part in the preparation of rubber goods. As any adulteration or poor quality in the Whiting will largely influence the character of the rubber with which it is compounded, it becomes necessary for the rubber-manufacturer of the present day who wishes to secure goods that will remain elastic and wear well, to see to it that the materials which he mixes with the rubber are of the very best quality obtainable. A few words, therefore, as to the origin and distinguishing characteristics of Whiting and Paris White, as well as to their method of preparation, may be of interest.

Whiting may be looked upon as a purified or prepared form of carbonate of calcium, of very soft and flocculent quality. It is generally prepared from English chalk, while Paris White, which is closely allied to Whiting, for it has the same chemical composition, is prepared from cliffstone. Cliffstone is merely a much harder and more compact form of chalk and so Paris White differs from Whiting only in its greater density.

Although there are in America very extensive beds of nearly pure carbonate of calcium in the limestone deposits which form the ground of whole States, yet this material is entirely unfit for use in the preparation of Whiting and Paris White. The reason for this is to be found in the different physical structure of the particles of which these limestones are composed. In the limestone, their structure is generally crystalline or granular, and they retain their gritty and rough quality, no matter how finely they are ground. The particles of chalk, on the other hand, are soft and flocculent, presenting under the microscope no distinct crystalline form; in other words, they are amorphous, or devoid of form, and decidedly softer to the touch.

Chalk, therefore, which is the friable form of carbonate of calcium, furnishes the raw material best suited for the preparation of Whiting. It occurs in but few places in America, in localities too far removed from the centers of production of Whiting to make transportation by rail to those centers possible. In Europe, however, its geological importance is very great, for it forms the upper member of the great Cretaceous group which occupies nearly the whole of the southeastern part of England and a considerable part of the north of France. According to the late reports of the United States Geological Survey all the chalk and cliffstone which serve for the manufacture of Whiting and Paris White are imported from Hull, England, on the British Channel.

Chalk is of organic origin and is almost wholly made up of the accumulations, through millions of years, of cast-off shells of microscopic animals. It is white, opaque and generally quite soft, without the least appearance of polish in its fracture. Its specific gravity is about two-and-a-half times that of water.

It is usually soft and earthy, but occasionally compact and rather hard, as in the case of cliffstone, and it is often of a yellowish white or even red color, due to admixture with oxides of iron. Several of the following substances are likely to occur with it as impurities: Quartz sand or flint, silicious matter, oxides of iron and alumina, magnesia, phosphates and organic matter. These substances are, for the most part, removed in the process of making the Whiting.

This process, which is very simple, is carried out on an enormous scale in this country, and is confined to some half-dozen manufacturers, the main seat of the industry being located in the vicinity of New York and Philadelphia. The chalk is first broken up, to free it partially from flint, after which it is transferred to large stone troughs where it is ground wet in mills, under huge revolving buhrstones while continuous streams of water wash away the finer particles. The milky fluid which results passes in succession through a series of tanks where the floating particles of chalk are allowed to settle. These tanks then yield various grades of purity and fineness of Whiting, the more flinty being naturally found in the first tank. After settling, the water is squeezed out of the moist pulp by means of powerful filter-presses which convert the Whiting into cakes about a foot square and three inches thick. The latter are carefully dried by steam heat, pulverized once more, and after careful sifting through bolting-cloth, packed in barrels or bags ready for the market.

The article known by the name of Paris White is generally prepared from cliffstone. With proper care in the grinding, floating, pulverizing and bolting it becomes very soft, but is always somewhat more dense than Whiting. Its mode of preparation differs but slightly from that just described.

The finest and purest grades of Whiting are known as "Gilders" and "Extra Gilders."

Inasmuch as any porous material, like Whiting, is liable to absorb considerable quantities of water from the air by exposure, it is very necessary to keep it in tight vessels and perfectly dry. Where this is impossible, or where the Whiting has accidentally become moist, it will be well to remember that this moisture may cause puffing and blis-

* Member British Society of Chemical Industry, Deut. Chem. Gesell, Am. Inst. Min. Eng. and Soc. Chem. Ind.

tering in the rubber, which can be avoided by drying the material, at a moderate temperature, before use.

It is most important, here, as well as during the manufacture of the Whiting, that the drying temperature should not exceed 212° F., or the boiling point of water, for hasty kiln-drying, or drying under extreme heat, impart to it a gritty or harsh feeling, which is caused by a partial calcination or fusion of the particles. Under all circumstances the best results will be attained if the Whiting is dried over steam-pipes or in a drying-room heated by steam, the above temperature being a safe one to use.

In order to judge of the purity of any sample of Whiting or Paris White a very simple test may be made use of. These substances should consist of very nearly pure carbonate of calcium, which is readily dissolved by cold, dilute muriatic acid (one part of commercial acid to two parts water), with effervescence or evolution of carbonic-acid gas. The chief impurities of Whiting, on the other hand, are either wholly insoluble in the cold acid or are dissolved with difficulty. Likewise, if powdered gypsum (sulphate of lime), or baryta (sulphate of barium), have been added, fraudulently or otherwise, to the Whiting, these substances would neither effervesce, upon adding the acid, nor dissolve. If, therefore, a thimbleful of Whiting is placed in a glass vessel, and treated in the cold with about an ounce of muriatic acid of the above degree of dilution, the powder should effervesce strongly and dissolve, while the amount of insoluble sediment left, after the solution has been allowed to stand for about a minute, should be almost imperceptible.

A large amount of gritty and more or less transparent sediment would indicate that the Whiting had not been carefully freed from flint or sand and was of poor quality; but if abundant, opaque and pure white, there would be occasion to suspect the presence of the far more objectionable adulterants, gypsum and baryta. If, therefore, upon adding a few more drops of strong acid, no effervescence takes place, the white sediment cannot be Whiting, but may be one or the other of the above adulterants.

While these substances are not very frequently found in Whiting, they seem to occur—no doubt accidentally—in so many paints and even foods, where they do not belong, that it is well to suspect their presence in Whiting and guard against it, for they would injure its quality and might very easily be employed owing to their pure white color.

Indeed, according to the statements of the National Dispensatory, powdered gypsum has, during the past thirty years, been repeatedly sold in place of prepared chalk. As it is of a white color and does not effervesce with acids, its presence as well as that of baryta can be established readily by the above simple test.

A Newspaper on the Rubber Trade.

IN its annual trade review for 1891 the New York *World* prints the following under the heading "First in Rubber Goods":

"The year 1891 has been a most prosperous one for the rubber trade. The United States has strengthened its advantage as the leading rubber-manufacturing country. In 1890 all Europe's manufacture aggregated 12,000 tons; the United States for the same period consumed close to 14,000 tons. To be more definite, the difference represented the total manufacture of this country for one month. The figures for 1891 will show a much larger gain. As is the case in many other lines of trade, if you want to buy rubber manufactures you've got to come to New York. This city is the great distributing point. Hear what a representative of one of the biggest concerns has to say about the success of the closing year.

"Manager Kipp, of the Goodyear Rubber Co., said: 'Although the trade has experienced unpropitious weather, so to speak, during the past three or four months, the trade in rubber goods has been good. The year, taken as a whole, has been an exceptionally successful one. New ideas in electrical appliances have wrought an increased demand for rubber, and wherever it has been used it has been entirely successful. The year has seen increased trade in mackintoshes, and I believe more are worn in this country than abroad. In ladies' mackintoshes, of course, there have been many changes in style. You know women must have everything in dress according to the modes and we have to keep up with the changes. It is surprising to know the different styles which have come and gone. Some of these mackintoshes are perfect dreams. Of course I am too modest to say this; I quote the ladies. Our styles are in the main American. We can get up just as good plates in this country as they can abroad. In the rubber-clothing line we lead the world. We make up these goods in more durable and comfortable form than they do anywhere else. The best rubber—from Pará—is used in the clothing manufacture. As I have said, rubber is yearly entering more and more into the manufacture of goods, such as shoes, belting, etc., and the trade is experiencing a great boom. With a spell of rainy weather I think we would see the busiest season in years. Ninety-two will surpass this year, from all indications. In point of increase of manufactures while our domestic trade is showing such improvement, we are increasing our exports to a great extent. And what is more, this trade is certain to increase.'"

Low Prices Not Always the Best.

A CUSTOMER does not respect a trader any more by reason of his selling goods at cost or less than he does were the former to charge him a profit. People, as a rule, will quickly tell a dealer when goods have declined in price, and demand a reduction if his prices are above the market. They will not, however, apprise him when he is selling under market value. Independence in trade inspires confidence and gains customers, besides it is more likely to retain them than the pursuance of a policy which subjects you to their beck and call. When it is generally understood that you sell goods at market value and keep what your customers need, you can keep your trade as well as increase it steadily. Buyers, as a rule, prefer the honorable high-minded merchant who sells reliable goods at a fair profit to one who claims he sells lower than his competitors, and who looks solely to cheapness of prices to attract trade.—*Shoe and Leather Facts.*